



17. F. 4.



19. F. 4.







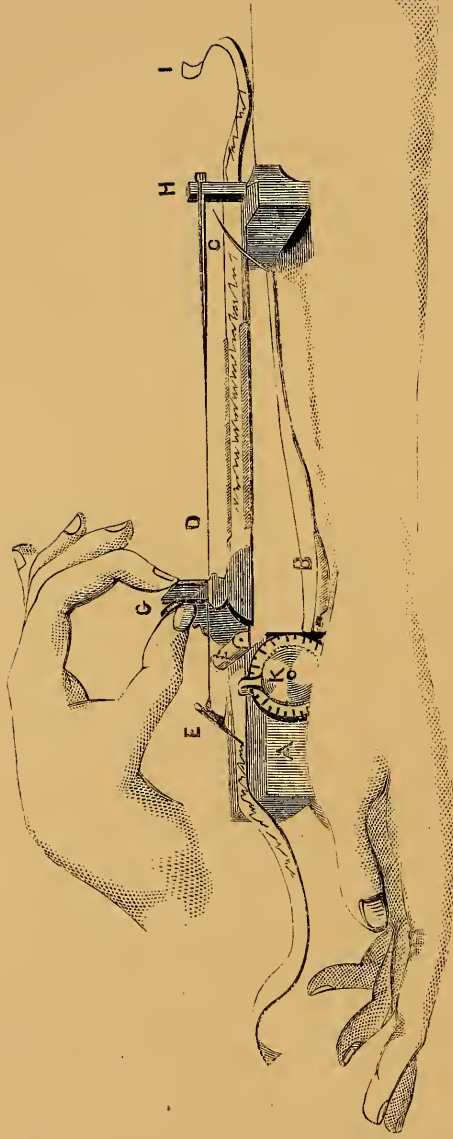




PRIZE ESSAY.



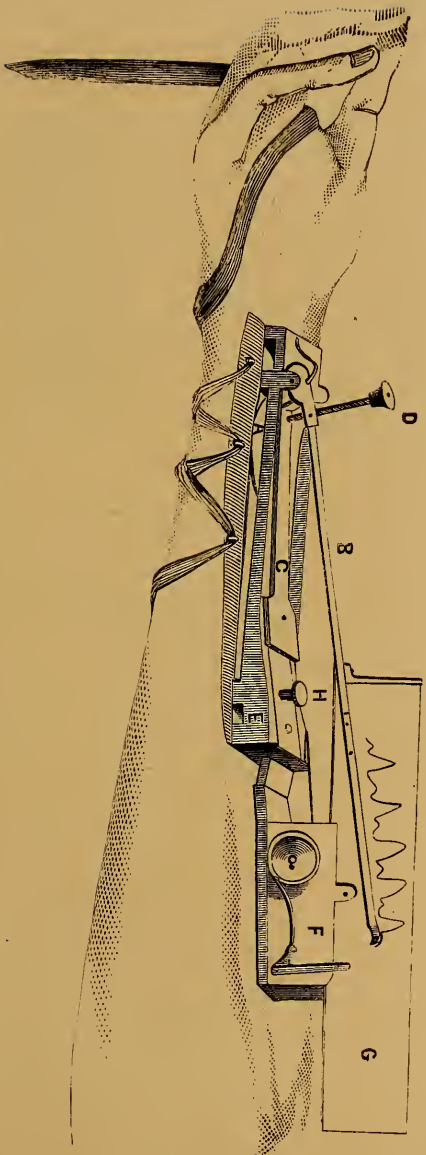




DR. HOLDEN'S SPHYGMOGRAPH.

**A**, the body of the instrument ; **B**, the pulse spring ; **C**, the end of the same bent to an inclined plane ; **D**, the tracer ; **E**, the pen ; **F**, the roller for moving the paper ; **G**, the holder ; **H**, the post for attachment of the tracer ; **I**, the paper for the writing ; **J**, the milled head for regulating the tension of the pulse spring ; also, the dial and brake or stop.





PROF. MAREY'S SPHYGMOGRAPH.

**A**, the pulse spring; **B**, the tracer, or writing lever; **C**, the lever for transmitting motion from the former to the latter (**A** to **B**); **D**, the pressure screw; **E**, the body of the instrument; **F**, the box containing clock-work; **G**, the traveller; **H**, the screw for adjusting pulse spring at a proper obliquity.



THE  
SPHYGMOGRAPH:

ITS PHYSIOLOGICAL AND PATHOLOGICAL INDICATIONS.

THE ESSAY TO WHICH WAS AWARDED THE STEVENS TRIENNIAL PRIZE,  
BY THE COLLEGE OF PHYSICIANS AND SURGEONS,  
NEW YORK, APRIL, 1873.

*Two hundred and ninety Illustrations.*

EDGAR HOLDEN, A. M., M. D.

---

PHILADELPHIA:  
LINDSAY & BLAKISTON.  
1874.

4457

Entered according to Act of Congress, in the year 1873, by  
EDGAR HOLDEN,  
In the office of the Librarian of Congress, at Washington.



JENNINGS & HARDHAM, Printers, Newark, N. J.

TO

WM. MAXWELL WOOD, M. D.,

LATE SURGEON GENERAL U. S. NAVY,

IN REMEMBRANCE OF ACTS OF KINDNESS, AND OF ASSOCIATION IN PERIL IN THE  
U. S. NAVY, AND WITH THE HOPE THAT THE LABOR BESTOWED IN  
PREPARATION MAY JUSTIFY SO CEREMONIOUS AN ACT,  
THIS WORK IS INSCRIBED BY

THE AUTHOR.



## INTRODUCTORY NOTE.

---

THE work as here presented has been the result of many months of labor, for the field has been pathless and virtually unexplored ; but it is hoped that it may prove at least a definite and tangible starting point for other observers.

The author desires to state to those who may have read his Essay, published by the State Medical Society of New Jersey, or that delivered before the New York Journal Association, that the views there advanced have been found in some cases erroneous, because drawn from tracings made as with Marey's Instrument, without the means since adopted for accurately determining the compressibility of the artery.

Since then, moreover, the facilities afforded as medical adviser of one of the largest Life Insurance Companies of the United States, and as clinical physician for diseases of the chest to St. Michael's Hospital, have been more liberally drawn upon, that previous opinions might be verified or corrected.

The Essay thus published differs somewhat in form from that presented in competition for the Stevens Prize, but only as regards a certain diffusedness both of tracing and subject matter ; and it is believed that as the tracings particularly have been culled with care, the work has been made only the more serviceable. It may thus be of the more assistance to any who desire to pursue the complex yet interesting study of Sphygmographic hieroglyphics.

The reader is desired not to consider the tracings of cases as the universal and invariable exponents of individual diseases. Such could only be obtained after long and patient investigation into every variety and phase of disease, and is equivalent to making a new symptomatology, a task indeed for a generation of observers. They will, however, probably prove in all cases suggestive of the pathological condition involved.

EDGAR HOLDEN.

NEWARK, N. J., October, 1873.



# CONTENTS.

---

## PART I.

### CHAPTER I.

#### GENERAL CONSIDERATIONS REGARDING MECHANISM.

Vierordt—Professor Marey—Defects of Instruments hitherto—  
Description of Marey's Sphygmograph, and Illustrations of the  
Principle involved—Objections to Pressure *upon* the Artery—  
Improvements by Professor Sanderson—Advantages of a new  
Principle in Construction—The Pen and its Action—The Pressure  
Spring and its Index—Drs. Anstie and Sanderson on the amount  
of Pressure required—Possibility of Utilizing 17,000 grains—Dial  
described—Value of a Knowledge of the Minute Peculiarities of  
the Arterial Current, . . . . . 17-29

### CHAPTER II.

#### INDICATIONS AFFORDED BY THE PULSE.

Ideas of the Chinese—Physiological Variations—Quotation from Da  
Costa—and Description of Chief Varieties of Pulse, . . . . . 30-38

### CHAPTER III.

#### TRANSLATION OF TRACINGS.

Shock Wave, or First Event—Indications afforded by this—Signifi-  
cance of Amplitude—Wave of Health—Axiom regarding Ampli-  
tude—Error of General Opinion—The Systolic Wave, or Second  
Event, . . . . . 38-45

## CHAPTER IV.

## THE SECOND EVENT.

Description of Chart—Explanation of Tracings given—Significance of this part of the Tracing—Corollaries—The Third Event—Explanation of the Cause of this Event—Wave of Recoil—Reference to Cases—Significance of this Event. . . . .	45-54
--	-------

## CHAPTER V.

## THE FOURTH EVENT.

Opinions of Naumann and Marey—Disproof by Sanderson—Cases and Tracings Illustrative—Deductions from a Study of the Tracings—Experiments with an Artificial Heart and Capillaries, published by New Jersey State Medical Society—New Theory, and Facts Substantiating the same—Is Dicrotism always due to Arterial Impletion?—Cases quoted—Dicrotism in Typhous Fever—Dicrotism of Epilepsy—Views of Voisin—Origin and Significance of the word Dicrotism—Tricrotism, . . . . .	54-64
--	-------

## CHAPTER VI.

## GENERAL PROPERTIES OBSERVABLE BY THE SPHYGMOGRAPH.

Compressibility—Oscillation, Locomotion, Recoil—Opinion of Dr. Corrigan relative to Locomotion of Arteries—Value of a Means of Ascertaining Compressibility—Causes and Significance of Oscillation—Singular Case in the Practice of Dr. Whittingham of New Jersey—Patient of the late Dr. Valentine Mott—Chart and Explanation of Cases—Summary of Points of Significance of Oscillation, . . . . .	64-74
---	-------

## CHAPTER VII.

## RECOIL.

Tracings from the Carotid, by Dr. Anstie—Significance of the Wave of Recoil—When a purely Physiological and when a Pathological Phenomenon, . . . . .	74-79
---	-------

## CHAPTER VIII.

## COMPRESSIBILITY OR TENSION.

Importance of ascertaining the Exact Character and Extent of this—Experiments of Prof. Dalton on the Sympathetic Nerves—Investigations of M. Bernard—Summary—Experimental Observations with Tracings, . . . . .	79-86
---	-------

---

 PART II.

## CHAPTER I.

## THE PRACTICAL APPLICATION OF THE SPHYGMOGRAPH.

General Considerations—Reduction in the number of Tracings Given, and the Reason therefor—Practical Suggestions to Observers, . . . . .	86-91
---	-------

## CHAPTER II.

## DESCRIPTIVE NOTES IN CONNECTION WITH TRACINGS.

Cases of Apparent Health—Influence of minor Disturbing Causes—Wider Deviations, suggestive of existing Disease—Debility—Hysteria—Tobacco Poisoning—Influence of Loss of a Limb on a Tracing, . . . . .	91-101
--	--------

## CHAPTER III.

## CASES CHIEFLY OF CARDIAC DISEASE.

Irregularity due to mitral disease—Opinion of Prof. Sanderson—Vertigo—Description of the Cases and Tracings—Functional and Organic Disease, . . . . .	101-113
---	---------

## CHAPTER IV.

## AFFECTIONS OF THE NERVOUS SYSTEM.

Mania-a-potu—Opinions of a Celebrated Observer, . . . . .	113-114
---	---------

## CHAPTER V.

## SAME CONTINUED.

Asthma and its Varieties—Cardiac Dyspnœa—Bronchitis—Progresso-loco-moto-ataxia, . . . . .	114-121
---	---------

## CHAPTER VI.

## SINGULAR CASES OF DOUBTFUL DIAGNOSIS.

Epilepsy—Rheumatic Arthritis, . . . . .	121-128
---	---------

## CHAPTER VII.

## PHTHISIS, ITS VARIETIES, WITH CASES AND TRACINGS OF SAME.

Selection of Tracings from Several Hundred—Detail of Cases—Acute Phthisis—Latent Phthisis—Chronic Phthisis—Aneurism—Imposture Detected, . . . . .	128-133
---	---------

## PART III.

## CHAPTER I.

## ACTION OF MEDICINES.

Detection of Effect prior to any Sensible Manifestation—Drugs Selected—Time of Commencing Observations—Facility with which Examination can be Made by the Experimenter on Himself—Cannabis Indica—Minuteness of Detail—Alcoholic Extract—*Twelve grains taken.*

Second Experiment—Instrumental and Physiological Observations Compared—Tincture Cannabis Indica—*One Hundred and Ten Drops Taken!*

Third Experiment—New and Fresh Tincture—Comparison of Sensations with Records—*Four Hundred and Twenty Drops Taken!*

Fourth Experiment—Fresh Alcoholic Extract—Terrific Excitement from Poisoning—*TWENTY SIX GRAINS TAKEN in Two Hours and Forty Minutes!*

Synopsis of Effects—Tracings of the following Day—General Deductions as to Effects of the Drug, . . . . . 133-149

## CHAPTER II.

## EXPERIMENTS WITH GELSEMINUM SEMPERVIRENS.

Reason for Selecting the Drug—Difference of Opinion among Medical Authorities—Sensible Effects—Opinion of Dr. Da Costa—Amount Taken—Effects Observable only by the Sphygmograph—Deductions, . . . . . 149-153

## CHAPTER III.

## EXPERIMENTS WITH ACONITE.

Fluid Extract Taken—First Case a Young Lady—Amount Taken— Interval before Circulation was Affected—Maximum and Minimum of Excitement—Arterial Tension—Deductions and Comparisons— Value to Pathology, . . . . .	153-158
--	---------

## CHAPTER IV.

## EXPERIMENTS WITH QUININE.

Small Doses—Single Small Dose and its Action on the Pulse—Re- peated Doses—Effect on the Nervous System—Deduction, 158-162	
---	--

## CHAPTER V.

## CONCLUDING REMARKS.

What has been Attempted in this Essay—A Construction of the In- strument Justified—A Discussion of the Value of a Knowledge of hitherto Undeveloped Features—The Power of the Instrument to Develop these, . . . . .	162-163
INDEX, . . . . .	165-169



# THE SPHYGMOGRAPH:

ITS PHYSIOLOGICAL AND PATHOLOGICAL INDICATIONS.

---

## PART I.

### CHAPTER I.

#### GENERAL CONSIDERATIONS REGARDING MECHANISM.

A SPHYGMOGRAPH is an instrument which can automatically record the peculiarities of the arterial pulse. According to Vierordt, to whom we are probably indebted for its suggestion, it was simply "an instrument which, when applied over an artery, indicated its character as to force and extent of undulations," and, as originally constructed, could accomplish this only with difficulty and uncertainty. More recently the ingenious device known as Professor Marey's, showed a wider significance in the sphygmographic tracing, and gave promise of great practical usefulness. It is no disparagement of the invention to say, that the sanguine hopes entertained with

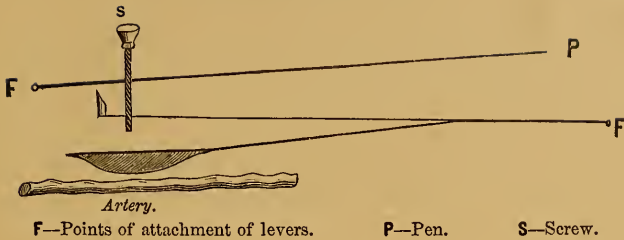
regard to it have not been fully gratified, and that to no inconsiderable extent the disappointment has been due to certain imperfections in the instrument itself. These, however, have arisen mainly from a want of ready applicability, and a tendency to fall out of repair, from the very perfection and refinement of its own mechanism.

As the word Sphygmograph is, to most of those who know of the device, intimately connected with the name of Professor Marey, it is but proper, before presenting results obtained by other means, to allude to the principles, merits and defects of his invention.

This may perhaps be more briefly done by presenting a skeleton diagram of the instrument, or rather endeavoring by an outline drawing, to illustrate its action.

A simple lever, attached at one extremity, rests at the other upon the artery to be examined, and compresses it, therefore, in a vertical direction; a second lever, bent at a right angle and lying directly above this, communicates its motion by a knife edge to a third, and this latter, which is at the same time the tracer, and has upon its free extremity a peculiar pen, amplifies or magnifies the motion communicated. This amplification is simply due to the fact that, as will be seen by the drawing, the motion is directed against the tracer very near its attached extremity.





A screw, near the same point, traverses the tracer and regulates the pressure. The other parts of the instrument, being simply accessories, with perhaps the exception of a concealed watch movement, designed to move the paper to receive the writing, need not be described.

This instrument is strapped to the wrist to insure immobility; and in the hand of its inventor has developed features in the arterial pulse never before discerned. Inasmuch, however, as disappointment has resulted from its subsequent use, and its delicacy and cost have limited the observations which should be manifold, within a narrow scope, it is a fair inquiry whether this disappointment may not after all be due, *not* to a meagre pathological or physiological value of the pulse-wave, but to some defects in the instrument employed.

A glance at these may both answer inquiry and suggest a change.

In the first place, the end of the lever, which may be called the pulse-spring, rests *upon* the artery and

compresses it, as already remarked, in a vertical direction. Thus, as may be seen in the following drawing, any increase of pressure flattens the vessel, and, as will be shown in speaking of amplitude of tracings and arterial tension, a deceptive result is obtained.



The movements of the spring are, as observed by Sanderson, not therefore those of the arterial wall in the fullest sense, and *extent* of motion is inaccurately measured.

As an artery is distended laterally as well as vertically, some of the peculiarities of the contained wave are of necessity lost; especially when the current of blood is small, and the flaccidity of the vessel considerable.

The second defect, as will be conceded by all observers, lies in the method necessary to secure the instrument to the wrist. This is done by straps, or rather a bandage, which hooks in alternate loops over wire pegs on the sides of the instrument, or may be a continuous and single band with straps and buckles. The difficulty of adjustment to the artery, even under favorable circumstances, is considerable; and when the patient is nervous and excited or frenzied by delirium, the tracing obtained after a prolonged trial cannot be accepted as the correct index of the pulsating wave. Indeed, so great is the liability to obtain an

inadequate or erroneous tracing, that many observers have cast the instrument aside, as unworthy the expenditure of time and patience.

Much has, however, been accomplished in the way of remedying this defect by the patient efforts of one to whom much reference must be made in this essay—as having, more than any other, endeavored to render the Sphygmograph of Marey of practical benefit—Professor Burdon Sanderson. Yet, after all, his devices did not perfectly obviate the defect last referred to; and only modified it in so far that the involuntary muscular movements in the wrist of the patient would not impair the tracing.

He adjusted slips of brass to the instrument in such a way that the body of it rested more firmly upon a surface of bone; but an elastic band was made necessary for the retention of this, and this added to what was a much underrated and *additional* defect, viz., obstruction to superficial venous circulation, by the retaining straps. To be sure, this obstruction would of necessity be slight, but, in obtaining a record, the nicety of whose indications depends upon such minute particulars, even so slight an obstruction *might* vitiate our results.

To what extent this is actually the case, will be seen by reference to the direct experiments made in this direction, and recorded in this essay.

The third, and, as will be shown by a multitude of observations, vital defect, is the inability to accurately and quickly determine the compressibility of the artery.

By the adjustment of the brass slips referred to, some improvement resulted, inasmuch as, after a series of experiments with various weights, an approximate relation could be arrived at between the distance from the surface of the lever to the spring, and the actual pressure at the time upon the artery.

Other workers adopted various devices to remedy this defect, one only, however, seeming to be a real improvement, viz., that of graduating the screw according to a pre-arranged scale, and thus having at hand an index upon the screw itself. By reference to the drawing, it will, I think, be manifest, that the defect consists in the screw itself, since it bears like an inflexible brake upon the levers with which it is in contact, and when we shall consider this compressibility as one of the most important elements in the arterial current, it will be seen that its ready and accurate record are essential to any real practical usefulness of the instrument.

Recognizing, then, the importance of having as few defects as possible in the device we employ to record the peculiarities of the pulse, and feeling indeed that the question of real moment does not relate to the

practical utility of any given Sphygmograph, nor yet of *the* Sphygmograph, in its best known signification, but to whether there is any deep meaning in the blood current of the accessible arteries, of value in Physiology, Pathology or Therapeutics, which can be accurately ascertained and recorded, I have endeavored to remedy the defects enumerated, as the best method of answering the question in hand.

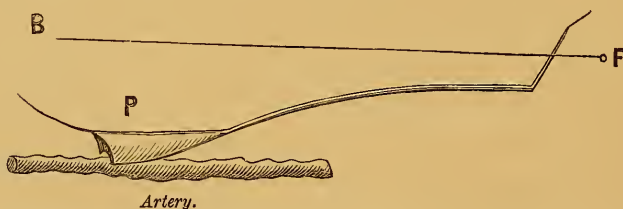
Despairing of any success in the direction taken by the eminent observers of England and the Continent, after their but partial success, it occurred to me that a new principle of construction might accomplish better results. In all instruments thus far adopted the attempt had been made to employ the *lifting* power of the current of blood to obtain a tracing, the difficulties of friction and amplification being the problems to be solved.

The arrangement of the levers and the shape and position of the tracing point, already considered, are probably the most perfect adaptation of mechanism in this direction. (See first Frontispiece.) But instead of attempting to utilize the *lifting*, why not employ the *displacing* power of the artery? Instead of having the spring press *down* upon the artery, let it partially surround it, thus: Then with each pulsation a force is transmitted not only up-



ward, but in an oblique direction, as shown by the dotted lines, the preponderance being toward the side upon which the spring may be inclined. Prolong the pulse spring, and shorten the distance between the point of attachment (the fulcrum) and the point of pressure, and this upward and oblique movement is evident to the eye. To amplify this, allow the free and distal end to be bent as an inclined plane or the curve of a circle; polish it to obviate friction; magnetize it, if desired, to add a repellant power to the power already evident, and allow it to impinge against another lever quite near its attached extremity, (a lever of the third order); make this last flexible, and its distal end will move with regular, accurate sweep under the distensile power transmitted.

The skeleton drawing below will illustrate more perfectly the principle involved.



*Artery.*  
**B**—Place for Pen. **P**—Pulse Spring. **F**—Attachment of Flexible Lever, i. e. Tracer.

The movement obtained by this means is from side to side, and not, as in Marey's instrument, in a vertical direction; and in consequence the paper to receive the

tracing may lie as in ordinary writing. (See design on second Frontispiece.) The accessories necessary to the application of this principle need not be described in detail; they are simply a framework of brass; a sliding-post for the attachment of the tracing-lever by which it may be brought in apposition to the inclined plane described; a watch movement for moving the paper to receive the writing; and a means for holding the instrument in the thumb and finger over the artery. The drawing on the second page may render this description more intelligible. Two points, however, of importance, are worthy a moment's notice, viz., the pen, and the means for determining and recording the compressibility of the artery.

As already stated, the motion obtained is from side to side, and although ample, it is yet so delicate that a hair upon it stops it at once. After many disheartening attempts to utilize chemical re-agents, and the suggestions of various persons of ingenuity, the simple plan of *pivoting* the writing-point—in fact an ordinary pen—and thus making the paper and not the delicate lever carry the weight, solved the problem—thus:

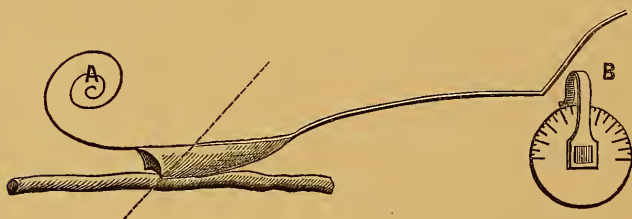


To ascertain with precision the pressure necessary



to obtain an ample tracing, it was evident that no power should be brought to bear upon the pulse, except that of the pulse-spring itself, since relative compressibility could only be accurately determined by variations of the intensity of a common force. The increase or diminution of pressure should therefore be ratios of the ability of the spring itself; in other words, the spring should have within itself the power to press lightly or heavily upon the artery. Its attachment to the body of the instrument was therefore made by a coil of watch-spring, whose tension could be controlled and measured on a dial, at will, an amount of pressure being possible beyond any requirement, and reaching four, five or six pounds.

The drawing illustrates both the coil and the recording dial.



It will be at once evident, that coiling the spring from its centre, A, will bring a pressure just in the very direction most desired, viz., downward and backward against and upon the vessel as indicated by the



dotted line. A curved wire, B, acts both as a brake to prevent the uncoiling of the spring and maintaining it at any desired point, and also as an index for the dial.

As the best and only test for the utility of any invention, is the amount and character of the work it will accomplish, more minute description may perhaps be dispensed with, and reference made to the charts presented in a subsequent part of this essay.

A few words of comment on the extent of pressure sometimes necessary, appear, however, in place at this point.

Most observers, especially Drs. Anstie and J. Burdon Sanderson, have found that a pressure of 100 grammes is the average minimum, and that by the device of the latter a variation of 200 grammes is easily attainable; this is equivalent to about 3,000 grains. It will be observed on the charts appended, that 700 grammes were often necessary; and it may be added, that in some cases I have found it possible to obtain a tracing under a pressure of 1,100, or about 17,000 grains.

The dial already described is, as will be seen in the drawing, marked in degrees, the equivalent of each in grains being easily determined by the equipoise of weights upon a balance. The following exhibits the amount of pressure exerted when the spring is coiled

sufficiently to bring the index opposite each degree :

0 °	—	about 100 grammes,	or	1,560 grains.
2½°	“	186	“	2,880 “
5 °	“	690	“	10,620 “

Somewhat singularly, the application of this different principle gives results similar, and therefore readily comparable with those of Professor Marey, and although the celerity and certainty by which the compressibility can be ascertained has often developed features of a pulse-wave that would have been concealed without this, yet the tracings are so nearly akin that they may be explained and treated under the same rules as his own.

Whether the defects that have so nearly wrecked the science of Sphygmography, ere it had well begun its career, have been fully corrected by the means described or not, the reader, who will patiently review the results obtained, will be able to judge.

Two elements, at least, toward the success of the instrument as an aid to science, will, I think, be conceded to the change in its construction, viz., a reduction in cost down to a reasonable and available point,\* and a more ready applicability.

Most of the tracings delineated on the charts were

---

\* NOTE.—The instrument used for this work has not become disarranged or out of order after several thousand tracings, and could be duplicated by the maker at a cost of about one-third that of the imported instrument.

OTTO & REYNDERS, Inst. Makers, New York.

taken during an ordinary visit, and occupied only from thirty seconds to two minutes; no fastenings were employed, and no preparation necessary, not even in most instances the preliminary rolling-up of the sleeve, save barely to uncover the radial pulse. The instrument was held by the finger and thumb of the left hand, the paper introduced, the ink applied, and the watch-work started by the other. To a great extent, therefore, nervous excitement due to the simple act of examination has not vitiated the tracing, and it is believed that so far as Sphygmographic observations can be the true record of the pulse-waves, these are reliable.

Of the many other devices for ascertaining and recording the peculiarities of the pulse, from the simple column of mercury and the semaphoric registration by the aid of photography, to the attempts to utilize the galvanometer, it is unnecessary to speak; since their failure hitherto to develop better results than their predecessors, has not yet brought them a measureable success. The subject of chief interest is, after all, outside of any particular *method* of observation, and relates to the observations themselves.

We may, perhaps, the better define the true physiological and pathological indications in these by discussing, first, *the actual value of a knowledge of the minute peculiarities of the circulatory current*, and then, *the power of an instrument to develop them*.

## CHAPTER II.

### INDICATIONS AFFORDED BY THE PULSE.

The pulse, from the earliest record of historic medicine, has been to the Physician a guide and instructor; and, although the elaborate anatomical knowledge of the present day has divested it of the mysterious element so familiar to the student of ancient medicine, and we no longer profess to divine or prophesy by its aid, it is still, in many cases, the key to our patient's condition, and in all a valuable assistant in diagnosis.

Nor can this be due merely to the effect of education, or the example of our predecessors. Every skillful, ambitious physician realizes in daily life that the "tactus eruditus" is to-day as valuable an acquirement as in the days of Galen. We may no longer hide our ignorance under the look of deep and dignified wisdom, or with our fingers on the pulse shake our heads with complacence, while puzzling confusedly over the remedy it would be best to hazard on the case. It is our privilege to have within our reach ample means of information, and neither to over or under-rate the significance of the pulse we feel. To do this, however, it is not sufficient that we be versed in

anatomy or physiology ; for, as we realize to-day that we can read a deeper meaning in its throbbings than a year ago, so each year's experience shows new indications to our more practiced touch, and we feel that without it we should be often in doubt, when doubt might be fatal to our patient. We are wont to regard as absurdities many of the notions of the early physicians, simply because the better facilities of modern times have shown their deductions to have been untenable ; but we overlook the fact that, although shut out from *our* refinement of pathology, they were yet not devoid of wisdom, and, drawing largely from experience, often showed that the homage and respect bestowed upon them were well deserved. We deride the assumption of mystery, although it is fast becoming evident in the present age, that its absence is far from beneficial.

There is, perhaps, no better aid to the success of the charlatan of to-day, than the arrogance grown out of a little knowledge that presumes to weigh for itself questions of disease and treatment. The contempt of familiarity has taken the place of the faith that once helped to cure.

We may be, however, and probably are right in regarding the diffuse nomenclature and labored attempts to make of pulses critical guides to treatment, as not particularly wise, yet in the days of Solano it

is not improbable that they possessed value, crude and imperfect it may be, but value of which we with better information have no knowledge.

This concession can hardly be made, however, to the Chinese of even our own day, by whom the pulse of one wrist is believed to indicate the disease of one organ, that of the axillary artery of another, and who pretend by the femoral pulse of a pregnant woman to determine the sex of her child; yet even in this extreme tax upon credulity there is more of good sense than we are at first inclined to believe; and the fact was strongly suggested during a series of experiments with an artificial heart and system of vessels to which allusion will again be made in this essay. *e.g.*

Upon ligating one of the capillaries in a network of interlacing tubes, the quantity of fluid forced through them remaining the same, very little disturbance or change appeared to have been caused in the others, at least so far as the touch could decide; and yet it was evident that a larger quantity of fluid was compelled to find its way through them than before. A Sphygmograph however, indicated a difference; and when two or more were ligated, a perceptible difference was observed by the fingers. Apply this fact to the human body: suppose, for example, a mass of enlarged lymphatics obstructing the subclavian artery; if this obstruction were slight, the differ-

ence in the feeling of the axillary artery might be perceptible, while the radial, being smaller and more distant, would appear to be unchanged ; or, suppose an engorged liver, or spleen, or hepatized lung, it is by no means irrational to assume that *some* change would occur in even a remote artery. Our experience with the fact that ligating a limb will check an hemoptysis or other hemorrhage exhibits the same fact. Out of similar observations may possibly have grown the whimsical oddities of the Chinese.

What the change in the arterial wave, remote from the source of disease, may be, we may not be able accurately to determine ; but in the artificial system referred to, it was a peculiar oscillating feel, sometimes a thrill, and more frequently an increase in the fullness, suggestive of the *pulsus magnus et durus* of old writers. The Sphygmograph, however, may yet be able to determine this with approximate certainty ; and, though we laugh at the Chinese, it is not *impossible* that it may reveal a difference between the right radial and the left, when an organ on the right side is the seat of disease.

Laying aside Sphygmographic definition, the pulse may be briefly defined to be the perceptible distension of those arteries of the body which are accessible to touch or sight ; and in a purely physiological sense the distending process may exhibit singular variations.



There are some that are marked and familiar. The variation may be that of *interval* (increase or diminution in *frequency*), as under emotion, fatigue or exertion. Rarely it may be that of *rhythm*, the beats being unequal or intermittent; this, however, is more frequently *other* than a physiological variation. The most common form of it is probably that in which the period of rest is prolonged, due to a derangement of the sympathetic system. To say that it is, or may ever be, a *purely* physiological variation, assumes, I am aware, to decide a question concerning which difference of opinion exists.

It may be a variation of *volume*, as in the plethora of the young and robust, so long as this falls short of disease; more strictly this is exemplified during the contraction of the capillaries from cold.

The variation may be one of *duration of impulse*—that is to say, the distension may be soft and even, or have a sharp accentuation due to nervous excitement. The latter change is commonly accompanied by a sense of vibration when the ear is applied over the heart.

The shades of variation are more clearly expressed in the Sphygmographic writings, on charts 1, 2, 3, 4 and 5.

*Pathologically*, the variations of the pulse are of of greater significance; thus changes in *frequency*



may indicate the wide departure from health of cerebral disease or excessive fever, or the steady sapping of vital energy in any constitutional disease, when, as expressed by Latham, it has engaged the nervous system perilously. Quickness, as distinct from frequency, assumes a new signification, as in phthisis or inflammatory fever, or the impaired and irritable heart of dissipation, or excessive use of tobacco.

*Volume*, in a pathological sense, becomes the index of cerebral compression, of blood poisoning, of hypertrophy, or the loss of contractile tone of the artery itself.

The variation of *rhythm* is still more important, whether as the precursor of a gouty paroxysm—of the action of certain poisons, as of digitalis or colchicum; or as indicating mitral disease (Sanderson), or fatty degeneration (Dr. Todd).

*Strength*, as indicative of increased tonicity; and *weakness*, as of dilated left ventricle, or unhealthy blood; of ebbing life in cancerous disease; or the debility of innutrition, are qualities most familiar.

*Tension*, or *resistance* of the pulse, finally offers to the touch a guide of considerable importance; and when we shall come to consider its pathological value from a sphygmographic point of view, will be seen to deserve more than passing notice.

The arteries, full to repletion, are incompressible, be-

cause unable to free themselves from the accumulating blood with sufficient rapidity, and the fullness may be due to either interference with avenues of escape in front (the capillaries), or exaggeration of quantity of fluid forced into them from behind (over-working heart). In the former case a deranged sympathetic system may be indicated, and in the latter an hypertrophied left ventricle.

Before proceeding to the consideration of these variations from a sphygmographic stand-point, the cursory and brief manner in which they have been reviewed, suggests a summary, and probably no better could be given than by quotation from the work of Da Costa, on Medical Diagnosis, pp. 38 and 39 :

“ A hard, full, frequent pulse occurs in active inflammations, and in most of the acute diseases of robust persons.

A hard pulse, full or small, bounding or not, if unconnected with acute symptoms, leads to the suspicion of cardiac disease, or of an affection of the artery itself.

A tense, contracted and frequent pulse is met with in a large group of inflammations below the diaphragm, as in enteritis, peritonitis and gastritis.

A frequent pulse, full or small, but rarely tense, is the pulse of most idiopathic fevers.

A very frequent pulse, but very feeble and compres-

sible, is the pulse of marked debility, of prostration, of collapse.

A pulse frequent and changeable in its rhythm, is produced for the most part by disease of the heart or of the brain.”

More particular features of the pulse-wave developed by the instrument we are considering, such as are due to elasticity, contractility or locomotion of the vessel itself, the relative tension of the venous and arterial systems, the condition of the capillary structures, etc., may be better dwelt upon, after an endeavor to understand the hieroglyphics themselves.

### CHAPTER III.

#### TRANSLATION OF TRACINGS.

The different portions of a sphygmographic tracing, which possess any appreciable meaning, are termed *the events* of the tracing.

*The first event*, is the sudden, primary ascent, or shock-wave.

*The second event*, is the true systolic wave, or wave of filling of the vessel with blood.

*The third event*, is the diastolic collapse, or descending wave, the line permitted by the emptying of the artery.

*The fourth event*, has generally been considered the diastolic expansion or recurrent wave—the wave of diastole.

(In order to introduce no new element of confusion, into our subject, it will be so considered in this essay, although in some tracings there appears a wave evidently preceding this, viz., that of recoil. Instead of making it a new event, it will be introduced like compressibility as one of the general elements of a tracing.)

*The shock-wave, or first event.*

Sphygmographically, the pulse-wave is found to indicate several distinct occurrences. If the artery be full when the heart contracts and discharges its blood into the aorta, the first occurrence is a swiftly transmitted impulse, similar, as pointed out by Professor Sanderson, to that conveyed through a series of balls suspended in a straight line. Upon striking the first of the series the last or outer one only is propelled.

(As explained by him, when objected that this occurs only with elastic bodies, and that blood is not elastic, the elasticity of the arteries by a well-known law gives to their inelastic contents their own property). This transmission may, if the artery be full, be almost instantaneous, and is important to the proper understanding of all tracings. The writer quoted has ascertained that this transmission is at the rate of about ninety feet per second. It is at any rate frequently exhibited by a sudden ascent of the tracing just ahead of the filling of the artery; and is consequently the cause of the first wave, under the circumstances named, and indicates either one of three things (see example A):



- 1st. Increased vigor of contraction of the heart, as in hypertrophy of the left ventricle.
- 2d. Increased irritability, due to disease of the sympathetic system.
- 3d. Increased irritability, due to simple nervous excitement.

*The amplitude of this initiative wave is in direct proportion to tension.*

The distinction between tracings in which this feature is due to pathological change and those in which it is a purely physiological event, may not always be easy, but even if it were supposable that ordinary means of auscultation and percussion were not available, or, as in the case of a deaf examiner, such assistance to diagnosis were impossible, there are yet two points of difference of great value: one, the persistence in disease, of increased impulse, as communicated to the hand applied over the apex of the heart—tending rather to increase during the sitting, and exhibiting a peculiar heaving motion (and suggestive, as observed by Walshe—p. 223, Dis. of Heart—of a pressure forwards, steadily against an obstacle); its increase, moreover, in extent, and quite frequently the lowering of the point of apex beat.

The other point of difference lies in the amount of pressure required to bring out the peculiarity.

Generally, unless when the disturbance of the sympathetic is sufficient to amount to disease, as in excessive use of tobacco, the increase of pressure tends to obliterate it in the simple form, while in hypertrophy a great pressure rather exaggerates it. (It is to be remarked, that simple hypertrophy of the left heart is now referred to, without dilatation or valvular disease; these complications presenting changes in the tracing peculiar to themselves.)

Should a diagnosis in any given case be of importance, the action of proper remedies and the disappearance of the wave under their use would be sufficient to establish it, for it may be here remarked that this wave of a tracing is by no means an essential one. The normal tracing of perfect health is generally a single symmetrical wave, of which the following is an example:



And in this the transmitted impulse which we have described as causing a wave of shock, is merged into the next or true systolic wave, the wave of distension or simple filling.

This, which has usually been described as the second event, is most marked when the artery is a little less than full at the time of its occurrence; and it is the prominence of this which is referred to in the axiom of

Marey, that "amplitude of a tracing is in inverse ratio to the tension."

With the instrument I have used, this axiom is correct only in a very limited number of cases, and as only the power of an instrument to ascertain and record pressure with readiness could demonstrate this, it may here be the best opportunity to refer briefly to it.

A moment's reflection would seem to make it certain that if an artery be partly empty, a wave transmitted through it would lift its surface higher, and consequently give a wider tracing than if already full; but supposing the amount transmitted be the same in both cases, the statement could be true *only* if the distensible quality of the vessels were within narrow limits, as is the case when their coats are diseased, and the quantity of the fluid therefore forced to pass more slowly; and I have not been surprised to find that as the *vis-a-tergo* remains in both cases the same, and the *distensile quality of the artery is very great*, the amplitude bears no *determinate* ratio to the fullness of the vessel, *i. e.* the tension. In many instances, as will be seen upon the charts appended, a tense artery which will bear the highest pressure, gives the greatest amplitude of tracing.

The explanation of this apparent discrepancy of observation, probably lies in the fact already alluded



to, viz., the adjustment of pressure in the instrument used, for if a uniform rate be employed in all cases the axiom would be universally true. With facilities for adjusting pressure, the axiom might be that "*amplitude of systolic wave appears in inverse ratio to tension when a uniform pressure is maintained upon the instrument used, but often bears a direct ratio to it when a graduated pressure is employed.*" The reason for this distinction will be obvious when considering the physiological and pathological significance of tension and its measure, compressibility. It may be more clearly explained by the observation, that when we press firmly upon or into the distended artery we obtain a measurement not so much of the distension of the vessel as of the force employed for its dilatation.

*The systolic wave, or second event.*

Theoretically, in a pulse we should have but two events, viz., the filling of the artery, which is more or less quick, owing to the character of the heart's action, and its emptying, which is more or less slow; and practically these are the essential elements to be considered, for it is evident that by the former would be shown any increase or diminution in the filling force, *i. e.*, any increase or decrease of vigor in the heart's action, or any interference with the current by pres-

sure or otherwise between the heart and point of observation; and in the latter, *i. e.*, the emptying of the artery, would appear any distal obstruction, whether capillary or venous.

With the first of these we have to do in considering the systolic wave, or second event. As already observed, it is sometimes merged into the shock-wave, which should *precede* it. It is sometimes not at all discernible as a wave of distension, because merged into a quickly *succeeding* wave of impulse, and is subject to greater variations than any other part of the tracing.

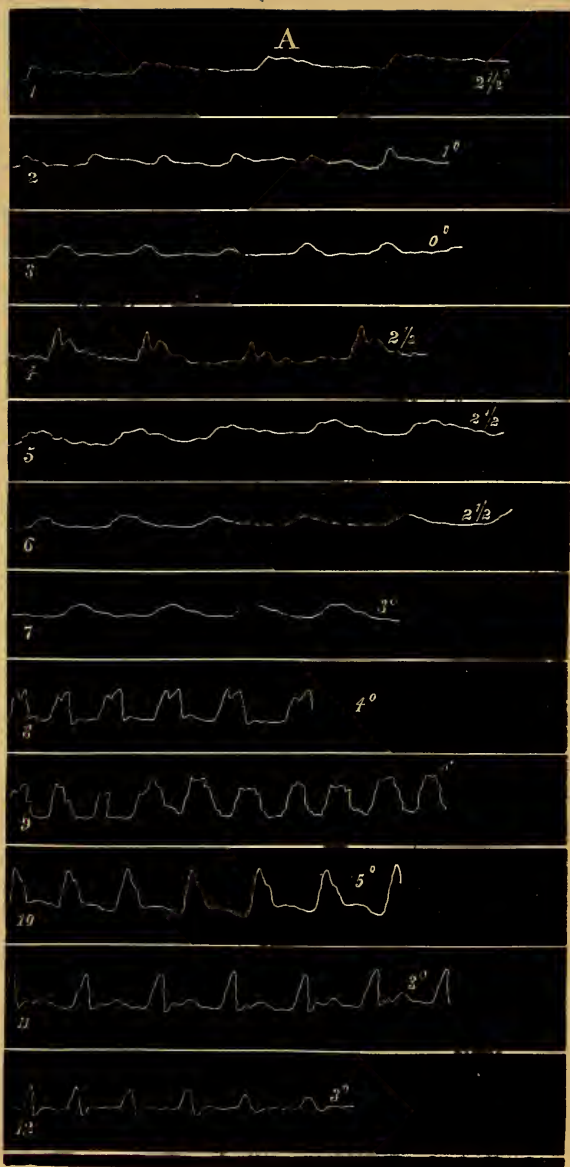
It was formerly supposed to be most fully developed in the pulse of old age. In the following hypothetical tracing it is indicated by the letter B, and represents in the artery the systole of the heart.



It is quite frequently almost impossible to determine whether it is postponed in the tracing, and so apparently hidden by a reflex wave yet to be considered, or really takes the place of that wave.

The reader may in such cases be able, from the amount of material furnished, to form an independent opinion.





## CHAPTER IV.

### THE SECOND EVENT OF A TRACING.

THE tracings on the chart opposite this page are examples of varieties in this wave, including some that may be subject to two interpretations.

*The first* is the tracing of a healthy person whose pulse generally gave a plain smooth wave, but who in this case was under the slight influence of the fluid extract of gelsemium sempervirens, taken for experiment. It is peculiar in nothing save the smoothness with which the wave of systole is developed.

*The second* is of the same person, under widely different circumstances. The systolic wave begins without marked ascent, apart from the shock-wave, and is indeed probably merged wholly in it, and were it not for the slight indication of the two events exhibited in the first apex of the writing, we might suppose the shock-wave to be absent. The fullness of the artery is prolonged almost to the beginning of the succeeding pulsation. This was due to the slow emptying of the capillaries, a condition arising purely from derangement of the sympathetic system from over-taxation and fatigue.

*The third* is an example from a healthy woman, twenty-four hours after delivery, and after and during a profuse metrorrhagia. This rounded wave has usually been considered the evidence of slow emptying of the capillaries, and *almost always* as indicating impairment of the coats of the smaller arteries. Example number six, which follows, illustrates this condition; but there is an abundant evidence to show that this is a far too limited signification. The case we are considering is an evidence of this, for since that observation was made, tracings have been perfectly normal. Other examples on the same chart show that no degeneration of arteries would be likely to exist, owing to the youth of the parties.

In the present instance the explanation probably lies in the fact that the heart failed to fill completely during its diastole, and therefore lacked the customary stimulus of impletion, for no obstruction to circulation seems to be indicated in the tracing.

*The fourth* is the record of a man subject to epilepsy, but in whom no organic affection of heart or other thoracic viscera could be detected. This variety is frequently met in organic disease of the heart, but generally only when cerebral symptoms have also given trouble.

*The fifth* is that of an hysterical female, with no disease except uterine ante flexion—the only source of

annoyance in the case arising from globus hystericus. The peculiar elevation of the systolic wave above the first is an unusual event where no disease exists, and in this case was probably due to the volume of blood discharged into the aorta with each pulsation, and a perfectly unobstructed capillary delivery. In such cases tracings may vary singularly, during a sitting, since any of the disturbances of the capillary circulation, so common in hysteria, may at any moment occur, and a state of arterial or venous tension change the whole character of the record.

*The sixth* exhibits the compressible artery with weak heart and degeneration of arteries of a patient eighty-one years old, suffering from chronic phthisis, and frequently from venous engorgement. This latter condition, which properly belongs for description under the subject of "tension," was in this instance always the precursor of an increase of cough and other troublesome symptoms, which compelled the patient to take to the bed.

Singularly emaciated, the veins of the body at such times, where most superficial, were prominent, dark blue and distorted. It is impossible to conceive a nearer resemblance to an anatomical preparation designed to show the veins, than the hand of this patient, yet when relieved by proper nervous stimulants, or

otherwise, they were not different from those of other emaciated people.

The radial arteries gave no indication to the touch of calcareous degeneration, nor indeed is it likely that such existed.

*The seventh* is the record of a young lady twenty-three years of age, suffering from aortic valvular disease. The general flatness of the wave, which has already been alluded to as a subject of some difference of opinion, the distinction between the first and second event and the prominence of the latter, as in the case of Mrs. V. (see above, example 5), are the only points of interest. The tension, as indicated by the degree of pressure requisite, is greater than in any of the preceding, and indicates a prolongation of effort of the heart to overcome some obstruction.

*The eighth* is the tracing of a young man, suffering from serious valvular disease. The affection followed acute articular rheumatism, and in many of its circumstances is a case of particular interest. So far as our present purpose is concerned, however, it is presented merely as an illustration of a peculiar form of systolic wave. The other features of the tracing will be explained in their appropriate place.

*The ninth* is a tracing taken over a subclavian aneurism, which subsequently burst, and in which a post mortem examination was made. The systolic



wave is evident in each apex of the writing, varying in each to a remarkable degree. The abrupt termination of the wave, as shown by the sharp angle which determines the commencement of the collapse, indicates the absolute want of elasticity of the vessel, and for the present is the point of chief interest.

*The tenth* exhibits the marked preponderance of the first above the second event, in a young lady with aortic obstruction and regurgitation. The high pressure required upon the artery is a feature of interest.

*The eleventh* gives probably the smallest systolic wave obtainable as a distinct event, and contrasts remarkably with the preceding. It is the record of a young man during slow convalescence from a pericarditis with endocardial complication and subsequent hypertrophy.

*The twelfth* was taken from the same person on another occasion. This remarkable tracing may be open to more than one interpretation, and it is not improbable that I may be mistaken in translating it, simply as an exhibit of the two events we have been studying.

If I am right, the systolic wave is deferred considerably beyond the usual time, and the artery once filled remains so till after the heart has again begun to contract. The only other cases in which I have observed

this peculiarity have been two, a victim of senile gangrene, and another, a case of advanced phthisis.

This event may have the following variety of signification :

1st. It shows the manner in which the chief function of the heart, that of supplying the blood to the arteries, is performed, whether as to force, duration of propulsive effort or method of cessation.

2d. The condition of the capillaries may by it be to a great extent determined, especially with reference to their contractility, as may be seen by reference to the changes grown out of sympathetic disorder or degeneration of their tissues.

*1st corollary.* The condition of the nerve supply to the heart, and the possible influence of cerebral disorders upon its action, may be to some extent ascertained.

*2d corollary.* It will, in most instances, determine the *volume* of blood delivered at each cardiac systole.

*3d corollary.* It may enable us to decide upon the condition of the mitral or aortic valves.

The next feature of a sphygmographic tracing is one that naturally follows the one just considered, for as that was a wave due to the filling of the vessel, this would show its emptying or collapse. As it is of course synchronous with the cessation of the filling force and the diastole of the heart, it has generally been termed the diastolic collapse or third event.

*The third event.*

This, as already said, is but the evidence of what occurs in the artery after the distending or filling power is removed. A moment's reflection will show that as the arteries are for all practical purposes open only at one end, *i. e.* toward the capillaries, it is through them that the contained blood must find escape. If it does so, other things being equal, the wave of distension, *i. e.* the systolic wave or second event of the writing would subside suddenly or slowly, in direct ratio to the freedom of exit; but, as one may easily imagine an artery only partly full and *without any* means of escape for its contained blood, in which a propelled influx would produce distension and subsequent collapse due to a *retirement* of the wave, it is evident that the collapse may not always be a simple or easily explained event. Such is the case, and the variations in this part of a tracing are therefore of considerable importance.

It has been suggested that the period occupied by this collapse of the artery is significant, because the measure of duration of the contraction of the heart; but that this can hardly be the case, would appear from several facts, *viz.*, that although when the heart's contraction ceases, the propulsion in the aorta also ceases almost simultaneously, yet such cannot be true of the remote arteries, and at the instant of cessation

of current at the sigmoid orifice, there is still an onward movement in them.

It is true, that this condition must be of brief duration, but as fractions of seconds would be of value in estimating the actual duration of contraction in an organ whose evolution often occurs twice in a second, this feature of the tracing could hardly be relied upon as an index of it.

Further than this, there may and often will occur in a writing what I have elsewhere alluded to as between the third and fourth event, viz., a wave probably of recoil. This may be noticed in the tracing marked four, on the chart illustrating the systolic wave or second event. Its significance will be weighed in connection with the fourth event, yet to be explained.

For the present purpose, it is only necessary to say that as this occurs during and before the actual cessation of the collapse of the artery, it must interfere with our deciding the instant of such cessation.

For examples of this event in a tracing, reference may be had to the chart above alluded to, illustrative of the systolic wave.

The slow and even emptying of the artery is seen in example No. 6.

The sudden collapse in Nos. 8 and 11.

The abrupt yet confused collapse in No. 9.

The failure of the event in No. 12.

That of the first case was due to a weak heart, but pervious though probably inelastic capillaries. With an excited or hypertrophied heart, this impairment of capillaries would have effectually prevented so even a collapse. Those of the second cases (Nos. 8 and 11) were due to aortic regurgitation.

Of the third (No. 9) to aneurism.

Of the fourth (No. 12) to commencing hypertrophy with excitement.

The chief significance to be attached to the third event is probably as follows :

1st. By it we may determine the manner of subsidence of the propelling power, such as would arise from dilated or weakened heart, or regurgitation of the blood back into the heart, whether from the aorta into the ventricle or from the ventricle into the auricle. Aside from the assistance to be obtained from other parts of the tracing, the existence of eccentric, as distinct from concentric, hypertrophy might be proximately determined.

2d. By it, also, information may be gained as to the manner of exit of the blood from the arteries into the capillaries, a matter the importance of which is closely allied to the condition of arterial or venous tension, and valuable from a physiological point of view, as of assistance in estimating the character of nerve supply and the action of remedies.

## CHAPTER V.

### *The fourth event.*

This has been variously styled the diastolic expansion, the diastolic wave, the wave of recoil and the recurrent or reflex wave. In a hypothetical tracing it could be represented as follows, letter C.



As this wave is a feature often of importance, and has been the subject of much discussion, any new facts elicited by a new instrument may serve to settle its true significance.

Naumann and Marey have supposed it a recoil of the blood current, due to a rebound against the closed aortic valves.

Many experiments made by Sanderson have disproved this theory, and a reference to the fourth tracing on the chart, opposite page 45, affords confirmatory evidence. Experiments made by myself also with an artificial heart, and elsewhere published, seem to render such an explanation untenable. As intimated on the preceding page, the tracing just alluded to shows that the wave of recoil correctly inferred to exist by Naumann and Marey, comes when at all, *before* the





4th event



collapse, and not after, and is probably almost synchronous with the closure of the valves.

The true diastolic expansion occurs subsequently.

Omitting further allusion to the opinion of others, I may be pardoned the attempt to explain the wave by reference to my own observations, but before offering such explanation would present examples of the event under varying circumstances.

The first (see chart of 4th event) is the case of a man under treatment for persistent vertigo, of full habit, robust and broad-shouldered, but with the red vessels apparent on the cheeks, and the peculiar appearance suggestive of apoplexy without any other actual or well-marked signs of it. For the present purpose, it is sufficient to say, that the *general* capillary circulation, of the integument at least, had never been impaired. Critical examination of the heart indicated disease of the aortic valves. The tracing shows marked shock-wave, sudden collapse of the artery, and consequently either the rapid escape of the blood through the capillaries, as if by their dilatation, or a limited supply of blood at each pulsation.

In this case the slip of paper was moving slower than usual. The influence of this variation in an instrument will be hereafter considered.

*The second* is that of a young female suffering from hypertrophy and aortic obstruction, with possibly

aneurism of the arch of the aorta. The most suggestive evidence of the latter seemed to be a marked thrill communicated to the hand when placed on any part of the thorax.

The slow filling of the artery as indicated by the flattened apex of the systolic wave, the somewhat sudden diastolic collapse, and the irregularity of the tracing, suggest a failure of the heart to propel a great amount of blood, such as would be the case, for example, in mitral insufficiency, where a portion of the blood is forced back with each systole into the auricle. The tension is somewhat greater than the preceding, and the dicrotic wave not remarkably prominent. The case itself will be elsewhere considered.

*The third* is the tracing of a young man, age twenty-six, with but one arm, amputation having occurred at puberty after an accident. The patient had generally been known as a healthy, hard-working man, but at the time of observation was somewhat debilitated from over-work and anxiety. A peculiar murmur could be heard over the pulmonary valves, but no distinct evidence of organic disease was discoverable. The indications of the tracing seem to be such as would arise from impaired action of the heart due to simple debility. The skin was moist and soft, the muscles flabby, and the integumentary circulation atonic. The patient has since recovered.

*The fourth* is the record of a man supposed to be sound, age forty, and accustomed to much travel and out door exercise. When thus engaged he is apparently vigorous, with exception of a chronic pharyngitis, but a few weeks confinement at office-work produces languor, cough and debility. Eight or ten years since he raised considerable blood, probably from the lungs. A rigid examination gave no positive evidences of thoracic disease at the time of the observation.

Dicrotism is not well marked, and might possibly be deemed absent but for the presence of the first and second event combined in the first wave. The collapse of the artery follows, and the next ascent is therefore truly dicrotous. Here also there appears atony, either of the heart or arteries.

*The fifth and sixth* are both from patients weakened by disease; the first a female with consolidation at the apex of one lung, occasional hæmoptysis and progressive debility; the other a man age sixty, much worn by the exhausting discharges and general irritation produced by a sloughing foot, probably a case of senile gangrene.

*The seventh* is a singular tracing for a person free, to all ordinary means of observation, from organic disease, but debilitated somewhat by excessive use of tobacco.

*The eighth* is from a man of fifty, during the pros-

tration of a low form of delirium tremens—healthy so far as known.

*The ninth* is common in phthisis, and in this case was the record of a young man rapidly growing worse and with extensive cavities.

*The tenth* exhibits very plainly the wave we are considering. It is the tracing of a young lady, age twenty-eight, much debilitated by prolonged mental work, the entertainment of company, and the cares of a large household. This patient has phlebectasis laryngea and hypertrophy with aortic regurgitation.

*The eleventh* is the case of a young gentleman with cardiac disease and debility, similar to the preceding.

Other examples of the dicrotous wave, or fourth event, will be found in a subsequent part of this work.

In summing up the examples given, one feature predominates, namely, a condition of atony either of the capillaries or the heart. We may, therefore, enquire whether this be the cause, and to what extent the phenomenon is explainable in our experience.

Two especial conditions are alluded to by Professor Sanderson in his work (p. 64), as giving rise to this wave, viz., a smaller quantity of blood than normal discharged by the heart into the aorta, and consequently a less quantity to be disposed of by the capillaries; and second, a dilatation of the capillaries by

which a *normal* quantity may be just as readily passed through them.

Experiments with the artificial heart, which need not be given in detail, show conclusively that freeness and not constriction of capillary circulation favors dirotism. The explanation of this phenomenon, which at first seems at variance with what we should expect, may be seen if we analyse the method of transmission of blood from the heart through the tortuous capillaries to the veins. As already said, when the onward movement ceases in the aorta and large vessels it is still evident in the remote and smaller; the cessation, beginning at the heart, travels quickly toward the periphery. During the most violent portion of the propulsive effort of the heart, the onward movement may be almost uniform throughout the calibre of any given remote artery, as, for example, the radial; but as this diminishes, the slowing of the current must appear in the part of it nearest the coats of the vessel, according to a well-known philosophical law; the best exemplification of which is seen in a running stream. In this, the water nearest the shore moves perceptibly slower than in the center, owing to the friction. In a tube of small dimension another principle is introduced, viz., that known as capillary attraction. In both cases, however, the same thing is true; the central part of the current is the last to fail and cease.

These two philosophical facts seem to explain in every particular the phenomenon of dicrotism. Under *all* circumstances, except those of such rigidity of arterial coats as to resist slight impressions, the condition might be educed. Careful adjustment of the instrument shows this to be true. If the arterial tissues were in a state of atonic relaxation, the wave would be increased. This also is true, for the condition has been heretofore best known in connection with adynamic fever. Were the amount of blood thrown into the aorta small, an event usually accompanied by relaxation of the elastic and contractile tissues of the body, the wave would be quite prominent. This, also, is true.

I am not aware that this explanation has ever been offered except, elsewhere, by myself; but as it appears to be consonant with practical experience with the instrument, and in no ways at variance with the experience of other observers, it has appeared to me the correct one.

In this connection it may be interesting to ascertain whether the deduction of Prof. Sanderson, that "dicrotism is characteristic of that condition of the circulation in which the arterial pressure is diminished while the venous is increased," is generally a correct one.

1st, Tracing (No. 163) was taken from a person in whom the venous engorgement was excessive, and

which was evidenced by exacerbation of weakness, and of all the unpleasant symptoms occasional during her previous illness ; so great, moreover, that the superficial veins were singularly prominent, even painfully so, and yet the chief feature in all the tracings taken was, as in the one given, the *absence* of dicrotism. Three days later the venous engorgement had subsided and the arterial pressure had increased, dicrotism being faintly evident.

2d, Case (No. 70 to 73—see chart) shows a precisely opposite condition. The patient whenever exposed to cold has attacks of vertigo, dyspnœa and faintness. At such times the veins, wherever within reach of touch or sight, are found flaccid and almost empty. The arterial pressure is very great, as will be seen by the degrees marked upon the tracings, and dicrotism is well marked. On other occasions when the equilibrium of pressure in the venous and arterial systems is more nearly maintained, the dicrotic wave is reduced or absent.

These two examples have been taken at random, and show that the deduction quoted cannot be universally true. They do not, however, militate against the explanation of the wave as given above ; and one additional and important fact may be added to this explanation as corroborative, viz., that it explains the well-known connection between dicrotism and hemor-



rhage, of which in typhous fever it is so often the precursor.

The significance of the fourth event may therefore be set down as indicating chiefly—1st, a condition of atony of the arterial tissues, particularly of the capillaries, as evinced in the dirotism of adynamic fevers; of debility from impairment in vigor of the heart, and of *reactionary* debility, as after delirium tremens. In all of these it is not improbable that the deficient tonicity is due to the condition of the inhibitory nerves. The dirotism of epilepsy, an example of which will be found in a later part of this Essay, and to which attention was probably first called by M. Voisin in the Biennial Retrospect of the Sydenham Society, 1867-8, p. 471, would form in this connection the subject of an interesting essay, so also that of asthma, vertigo, sun-stroke, etc., as seen upon the charts appended.

2d, From the very nature of the above essential peculiarity, it may be of value as a ground for prognosis when occurring during the progress of any wasting disease.

Before leaving the subject of the fourth event of a tracing—the dirotous wave—it may be in place to observe that the term has given rise to some confusion, because not literally expressing its actual meaning. Derived from *δίσ* and *κροτέω*, and meaning “I strike twice,” it has conveyed to many casual readers the



impression that any break in the smooth, even wave of robust health is an evidence of dicrotism. From what has been said concerning it, this will be seen to fall wide of its proper meaning. Tracings are, in a literal sense, frequently *tricrotous*; but for purposes of Sphygmographic interpretation, not so, correctly speaking. The words tricrotic and dicrotic, as similarly derived, should be held as having similar meaning, and this meaning was settled before the invention of the Sphygmograph.

The double beat perceptible to the touch of the older physicians could arise only from the occurrence of a second impulse, late enough to fall just prior to a new systolic wave, and quite subsequent to the diastolic collapse.

Whatever, therefore, may be the number of waves preceding the collapse of the artery, they cannot be termed dicrotic; the meaning of the term, as established years ago, should and does retain its old significance.

## CHAPTER VI.

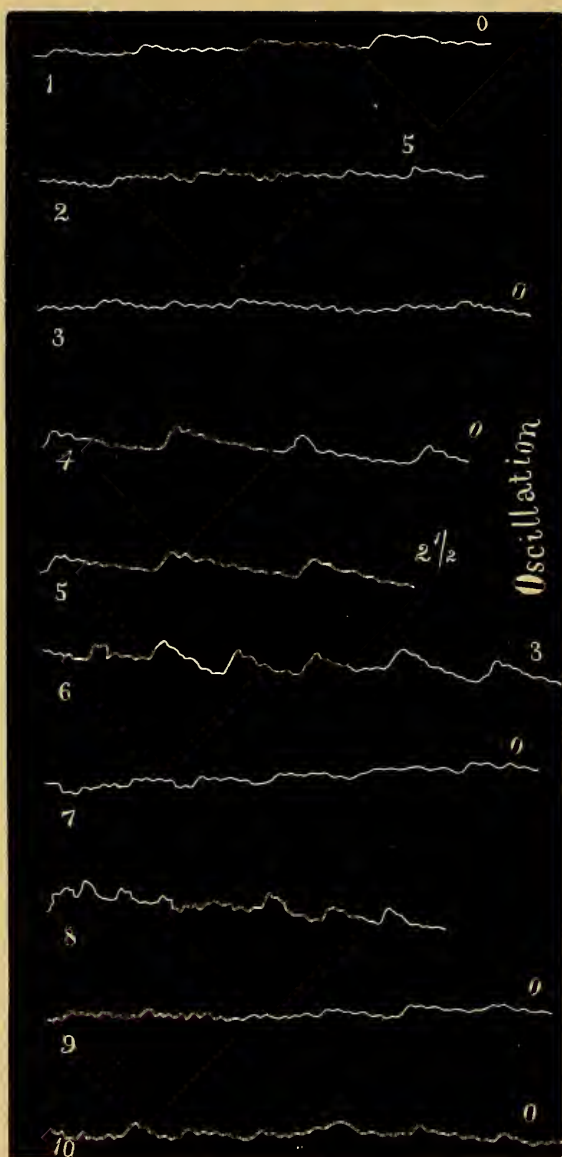
### GENERAL PROPERTIES OBSERVABLE BY THE SPHYGMOGRAPH. COMPRESSIBILITY, OSCILLATION, LOCOMOTION AND RECOIL.

MANY of the general properties of arteries and the circulation have been incidentally considered during the above remarks. There are, however, some of greater or less importance, deserving especial mention, viz: Compressibility (or tension), recoil, and oscillation of the circulating fluid; and of the arteries as purely mechanical contrivances, locomotion.

Of the latter quality, which is properly but an anatomical peculiarity, little need be said, save that as it is sometimes excessive, it may communicate a vibratory character to a tracing, sufficient to be mistaken for true oscillation of the blood current itself, or cause vexatious delay in obtaining a proper record. The property of locomotion grows naturally out of the elastic character of the arterial tissues, and is simply that displacement of the vessel often observable in old persons, whose emaciation renders the arteries quite superficial, or in any one, when under sufficient excitement to cause an unusual volume of blood to be forced into the arteries by the heart.

In the *former* case, the fact that all arteries elongate





under the pressure of the blood, as well as expand laterally, is quite evident to the eye, and it is probable that the locomotion is much exaggerated by the impairment of natural elastic resistance due to age.

In the *latter* case, it will be usually found accompanying great arterial fullness.

It is easy to perceive how any excess of this quality should exhibit itself in a tracing. Generally, however, the groove in the pulse-spring already described, by fixing the vessel against lateral motion, prevents the marring of the record, and the regulation of the pressure-spring utilizes the quality to increase the amplitude of the tracing.

The chief pathological significance of locomotion is probably in connection with cases of aortic regurgitation, as remarked by Dr. Corrigan.

#### *Oscillation or Vibration.*

This quality of the circulatory blood is an important one in connection with the translation of a Sphygmographic tracing. It is to be carefully distinguished from the waviness of line caused by muscular or tendinous tremor, which is of itself an interesting feature. It may be the best described by a simple illustration :

When a rubber tube of small calibre is attached to the ordinary house supply pipe, from the hydrant, the current produces to the touch no appreciable thrill ;

but when compressed slightly between the point of observation and supply, a peculiar vibration is communicated, often to such extent as to be accompanied by a low musical note. This vibration is most evident at the point of pressure, and diminishes as we recede toward the open extremity. Partially close the extremity, as by the division into smaller and branching capillaries, and the thrill is still better transmitted. Now apply the pressure more remotely, and examine in the opposite direction, no thrill or vibration is communicated in this direction, *i. e.*, toward the supply, until the pressure is made, however slightly, *intermittent*.

It is then well or ill defined, just in proportion to the amount of pressure and duration of intermission. The fullness of the tube at the time seems to exercise but little influence in the latter case, but considerable in the former.

Apply, now, this fact to the arterial system. The pressure of enlarged bronchial or axillary glands, or the simple twist of the fore-arm, which as is well known may be dexterously made to obliterate pulsation at the wrist, will sometimes communicate an oscillatory character to the tracing. As may be inferred, this would be slight or well defined, just in proportion to the amount of pressure and the fullness of the artery.

On the other hand, suppose a condition of the nervous system, such as is common in many cases, but, perhaps, most familiar in hysterical females, in which the capillary circulation is influenced by inhibitory nervous action. This action may be to such an extent intermittent as to exhibit itself in an oscillatory thrill in arteries of small calibre, precisely as in case of the intermittent distal pressure in the artificial capillaries. Examples of this are most frequent in blood poisoning by mercury, or Bright's disease, in asthma, in epilepsy, etc.

Another cause of oscillation of the blood in the arteries, may be the familiar one of aneurism. In the cases of this disease so far advanced or of such character as to cause a perceptible thrill to the touch, when applied to a neighboring artery, the waviness of the Sphygmographic line is peculiarly marked. Even in many instances, where a remote or contiguous artery appears free from any tremor under the finger, this feature is brought to light and recorded by the instrument.

Another cause of oscillation may be the direct pressure of the instrument in certain conditions of tension of the arteries. This is a fact observable with the single rubber tube already described. When this was made tense by an increase of water beyond the power of the tube to deliver readily, a very slight pressure

sufficed to produce a considerable thrill. When, however, the amount of tension was reduced by reducing the supply, a great pressure was found necessary to develop it. The deduction from these facts seems to be, that the vibration may be an index of tension. And such it *may* really be in the human system; for an artery is in many respects analogous to the tube described. There are, however, so many modifying circumstances in the one case that do not exist in the other, that the rule is by no means safely applicable. For example, there are cases on the charts, as carefully observed as possible, in which a pressure of 100 grammes ( $0^{\circ}$ ) permitted the exhibition of oscillation which disappeared at 300 grammes, and reappeared at 600. The very fact that so high a pressure gave *any* tracing was *prima facie* evidence of great arterial tension; but the disappearance of the phenomenon at the intermediate pressure it is difficult to understand. Another example, however, is explainable upon the principle described. Thus, when experimenting upon the action of medicines on a healthy pulse, 100 grammes ( $0^{\circ}$ ) gave a smooth even tracing, without vibratile character; 186 grammes ( $2\frac{1}{2}^{\circ}$  or 2880 grains) developed the oscillatory waves to a marked extent, while greater pressure failed to give any tracing. The inference, and a correct one in accordance with the law observed with the tube, is simply that the actual



tension of the artery was slight ; the *precise* deduction being that  $2\frac{1}{2}^{\circ}$  was above a proper register.

Another source of oscillation may be the existence of a partially detached valve at the aortic orifice. A singular example of this was presented to the Essex County Medical Society of New Jersey, by Dr. Whittingham, a year since (1871). The patient, a negro of middle age, had for about a year been under observation on account of a peculiar thrill observable on all parts of the body, but especially over the base of the heart, and of considerable intensity in all the superficial arteries. To the ear, the thrill became a low, almost continuous musical note ; to the touch, it was suggestive of the vibration of a guitar string. A post mortem examination verified the diagnosis above given.

Beyond the causes of oscillation already given, it appears not improbable that another may occur from the character of the heart-beat, as in hypertrophy ; for a condition in which the beating of the heart and even of the arteries is plainly perceived by the patient, is a familiar one, and in view of the fact that a slight blow upon a filled elastic tube communicates a thrill to its contents, such a character of the heart beat might produce a similar thrill in its attached arteries.

The existence of such a cause, however, would be easily ascertained by other means.

Finally, it should not be forgotten that an *apparent* oscillation may arise from muscular or tendinous tremor—examples of which may be seen in the chart on the opposite page.

*The first*, is a record from a lady, just past the prime of life, suffering from a fibroid tumor of the pharynx, and having a subclavian aneurism of thirty years' standing, formerly a source of annoyance, and under the treatment of Dr. Mott of New York, but long since quiescent. The tracing is from the radial artery of the same side. The patient was perfectly free from any apparent nervous tremor or excitement, as indeed is evident in the slowness of the pulse. No other evidence of aneurismal thrill was obtainable, and the swelling, slightly prominent above the clavicle, was dense and unyielding, probably owing to nature's restorative efforts.\*

*The second*, is from a patient twenty-four hours after a profuse uterine hemorrhage, following confinement. The tension, under the circumstances, is remarkable, but is probably due to the failure of the artery to collapse, as will be seen in the prolonged systolic wave.

*The third* is the record of an old man, just after amputation of the thigh at the middle third, for disease,

---

\* NOTE.—Autopsy has since shown this supposed aneurism to have been an exostosis on the first rib, pressing upward the subclavian artery.

and exhibits simply an oscillation due to nervous shock.

*The fourth and fifth* are placed in apposition because similar and yet dissimilar. The first is not the correct record of the artery as regards tension, because a pressure of 5° exhibited a condition of disease of the heart and its valves, at which pressure the oscillation ceased. The arterial tension was indeed great at the time of the observation.

The oscillation is slight, and the tracing would more properly come under the head of "recoil," that wave being evident in it, but that it offers so excellent an opportunity to compare that which follows.

This is the record of a healthy man, under the influence of Gelseminum, taken for experiment (aet. 32), and the very slight oscillation is probably due to some perversion of nerve influence in the arterial coats.

This example illustrates forcibly the necessity for regulating and observing a proper pressure in order to obtain a correct record.

*The sixth, seventh, eighth, and ninth* appear to be due also to some perversion of nervous vitality, and possibly are connected with the inhibitory function. They are (in order) those of a man of forty-five, otherwise sound, but the victim of the abuse of tobacco ;

of a younger man similarly disordered; of a man convalescent from delirium tremens (the arterial tension in this case was considerable); and of a man with suffocative bronchitis. The last two were of middle age (40-45). In the latter the oscillatory character was greater at  $4^{\circ}$  than at  $0^{\circ}$ , as given, but exhibited other features, marring it for this illustration. At  $2\frac{1}{2}^{\circ}$  the oscillation was absent, and this pressure was probably the correct register of arterial tension.

*The tenth* is from a delicate, hard-working female, debilitated by exhausting and prolonged labor. Vibration disappeared under a pressure of only  $1\frac{1}{2}^{\circ}$ , as in fact did the pulse itself. It is the irregular tremor accompanying debility, and may possibly be only the result of tendinous motion.

In reviewing the above cases, the fact that appears most indicated, seems to be that to some deranged nervous force is to be attributed the phenomenon of oscillation. It is, for example, marked in all cases of *progresso loco-moto-ataxia*, and is best illustrated in Bright's disease, delirium tremens, asthma, and the shock subsequent to amputation.

Its significance as a feature of a tracing may be thus summed up:

*Aneurism;*

*Distorted inhibitory function;*

*Severe disorder of the cerebro-spinal system ;*  
*Compression of the artery between the point of*  
*observation and the heart ;*  
*Compression by the instrument itself ;*  
*Blood poisoning, as in Bright's disease, or from*  
*medicines.*

It may be the *measure of tension*, and is the *measure of pressure as an index of tension*. It may be due to a *detached valve* or other *movable body in the large arteries*. It may be *simply apparent and due to muscular or tendinous tremor*.

## CHAPTER VII.

### RECOIL.

THERE will often be observed in a tracing a wave following the second event, always prior to the true diastolic collapse, and with or without the diastolic expansion, and distinguishable from the latter by its *precedence of the emptying of the artery*. It is not improbable that this wave, which seems not to have been before noticed except to be confounded with the diastolic expansion, might be developed by very patient adjustment of pressure upon the artery in a majority of instances.

As it seems to be more truly synchronous with the closure of the semilunar valves than *can be* the beginning of the collapse of the *radial artery at least*, which as occurring more remote from the heart must be a slightly later event, it may be interesting to inquire into its significance. In a hypothetical tracing it could be represented thus—D :



Examples of this wave may be seen in the records of the action of medicine upon the healthy pulse, as

in the case of *Cannabis Indica* or of *Gelseminum*. (See Part III. of this Essay.)

If in the subsequent remarks there may appear an assumption of certainty with regard to this wave and its cause, not fully warranted by the tracings adduced, it may be of interest to present here, testimony singularly corroborative of it.

In the *London Lancet* of November 10, 1866, there appeared the record of some experiments, made, I think, by Dr. Anstie, upon the difference between the pulse (as observed with a sphygmograph) of the carotid and radial arteries. A fac-simile of the tracings—upon the former—has been preserved and is given below.



*Tracing of the carotid of a man with no organic disease, convalescent from lead colic.*

By this appears what would naturally be inferred, if our premises are correct, from the proximity of the vessel to the heart—a *shock wave*, a swiftly-following *wave of filling*, or true systolic wave, and then, as the artery begins to empty itself of the first rush of blood, a second *shock-impulse*, synchronous with the closure of the valves.

In the radial also, it is not a difficult matter to see why such a recoil of blood should occur at such a time, or rather why an *apparent* recoil should appear, for, inasmuch as we have seen that the first event of a tracing is frequently a wave due to transmitted shock (the shock consonant with the bursting open of the aortic valves), we should naturally expect in certain conditions of the circulation that the *closure* of the valves with a shock almost equally sudden would produce a like result.

In fact, but for the difference in intensity of the two events, the latter would be *more* certain to produce it, for a more dense conducting medium has been created, and the direction of transmission is with the current. It is moreover just at the point indicated that we should search for it, viz., just before the collapse, which begins in the larger artery, has been transmitted to the smaller or peripheral. It is not improbable that in the tracings illustrative of oscillation I may have included some having this wave of recoil. Nos. 4 and 5 are open to this suspicion.

The chief significance of this wave seems to be, first, *arterial tension* (the more full the arteries the better it is developed) *not due to any organic disease*. The best examples of this will be found in tracings Nos. 25, 26 and 28, Part II.

When connected with organic disease as of the aortic



valves, in which their free falling back against the arterial wall is prevented, there would of necessity be less arterial tension, and if no regurgitation existed, the tracing, with this one exception of pressure required, would be very similar. This is exemplified in the tracings Nos. 62 and 63. In these it is interesting to note how the flattened top of the conjoined first and second waves exhibits the slow delivery of blood by the heart, as if contracting against obstruction; and also the similarity in other particulars to a healthy record. The patient was a young female with aortic valvular stenosis.

Second—A condition analogous to that which develops the most fully the first event or initiative wave of the tracing. This, as we have seen, is an increase of nervous vigor of the heart, perhaps better expressed by the word hyperæsthesia, and generally temporary in character. That there is a true nervous element exhibited by it is apparent from the cases in which it occurs, viz., asthma, hysteria, functional cardiac disease, and those showing the influence of Gelseminum, Aconite or Quinine, etc. Cannabis Indica produces it only when given in moderate doses.

It is probably safe to say, that it may be generally predicated of a sound organic condition when occurring with a marked "first event" in a tracing otherwise good.

Third—It is corroborative evidence of obstruction at the aortic orifice when occurring in a tracing with conjoined first and second wave, or in which a flattened wave, caused by the union of these two, drops with a perceptible angle. *Always excepting cases of high arterial tension.* Examples of these will be found in Part II. of this work.

One remark seems necessary, in addition, with regard to the occurrence of this wave as in any way the measure of tension. It has been said above, that it seems connected with a condition of tension only in health, or at least when no cardiac disease exists; and that occurring with a low arterial pressure it seems to indicate disease. Why the wave, if it be a true transmitted shock-wave, should be transmitted at one time by a full artery and again by one but partly filled, may seem paradoxical, in view of the assertion that fullness is essential to its production. The explanation however probably is, that in health a state of tension is requisite to allow a sufficiently dense conducting medium from the point of observation to the heart, but when a *prolonged* effort of the heart is rendered necessary by disease a more continuous and *even fullness exists* SHORT OF *actual distension*. This is evidenced by the fact that in the latter case the pressure is generally from  $2\frac{1}{2}^{\circ}$  to  $3\frac{1}{2}^{\circ}$ , whereas  $4^{\circ}$  or  $5^{\circ}$  are necessary in the former.

## CHAPTER VIII.

### COMPRESSIBILITY OR TENSION.

Thus far allusions to tension have always been to arterial fullness as compared with that of the veins; and naturally the measure of this fullness has been ascertained by the compressibility of any artery of moderate size. We have seen that under some circumstances there may be other means of ascertaining the same fact, but the best and most reliable is certainly the ability of the artery to bear pressure without obliteration. All observers have felt the need of some means, not only of readily bringing proper pressure to bear upon the artery, but of instantaneously and accurately recording it, and a glance at the charts presented will show how necessary this must be to any reliable record. In many cases of known disease of some important organ, a pressure such as has generally been used with Marey's instrument, has given the smooth even tracing of vigorous health, but a turn of the coiled pressure spring has brought out the evidences of serious disorder.

This may be true of even a dangerous cardiac disease, and therefore, no accumulation of records without this would be of practical value.

It is indeed often desirable or even essential to repeat observations with the same pressure, and to depend upon the other means indicated in the preceding remarks, to determine the fullness of the arteries, as in the recorded experiments upon the action of certain remedies ; for valuable time would be wasted in taking several tracings at the very short intervals allowed, but in examining the same persons on different occasions, tracings should be taken at various degrees of pressure in order to be positive as to the correct record ; for, in most instances, the highest degree which the artery will bear without obliteration is by no means the measure of tension, nor may it give the tracing of greatest amplitude. Generally, the amplitude increases up to a certain point, and then gradually lessens with increase of pressure. This point is undoubtedly the correct one at which to complete the observation at the sitting. From this it is evident that single tracings are not rightly comparable. Groups are requisite, and the reader may thereby be enabled to draw a correct deduction.

The importance of ascertaining the compressibility of the artery as a means of arriving at a correct tracing is self-evident ; but as an independent quality of great significance, and as one having a meaning apart from the waves of the Sphygmographic record, it deserves especial mention.

It often appears impossible to press upon the radial artery with the finger with sufficient force prevent its pulsation. Even when this seems to be accomplished, at the point of pressure it may be seen pulsating a little below, and it is evident, therefore, that the propulsive power with which the blood is driven into the capillaries may be enormous. As this point has been satisfactorily studied by the eminent physiologists of the present day, it is doubtless too familiar to bear discussion, but the degree to which it may vary under different circumstances, is of great pathological importance, and comes within the sphere of Sphygmographic observation.

By the amount of tension of the arteries, or, to express it more clearly, by the extent of accumulation of blood in them, we may infer the amount in the veins, the conducting power of the capillaries, and the condition of the heart.

From these three, as starting points, a wide range of physiological and pathological conditions may be decided. If we recall, for a moment, the experiments of Dalton upon the sympathetic nerves, their influence upon vascularity and nutrition, when divided or subjected to galvanization, or their connection with the cerebro-spinal system; and the patient investigations of Bernard into their influence over the phenomena of organic life; or consider the intimate relations between

the nervous and vascular tissues throughout the body, the effect of digestion, of exercise, of fatigue, of stimulants, of medicines, of temperature, or of emotion, upon the blood in arteries or veins; or think of the heart enfeebled by disease vainly striving to maintain the equilibrium of pressure so essential to health, we realize the importance of the quality we call tension.

When the familiar examples of contracted capillaries, as from severe cold or the influence of sudden fright, present themselves, we fail perhaps to think of the over-burdened arteries that are unable to rid themselves of the accumulating blood; but in cardiac disease so serious as to make the accumulation a new burden to the already over-taxed heart, these minor conditions attain a vital significance.

In such cases, the question as to whether the maximum of pressure shall be in veins or arteries, touches the life of the individual.

In cerebral diseases, in congestive or inflammatory stasis in different organs, in the damage done by dram-drinking, in the relapses that occur during convalescence from certain fevers, where the change in the capillaries is the first sign of change in their nerve supply, and the evidence of this in the compressibility of the arteries, is to us the warning of relapse; and in degeneration of the tissues of the arteries, where, as

in the case of Hughes, recorded in tracings 132 to 146, the extent of the disease is the measure of the patient's chances of life, this feature of arterial and venous tension is most important.

Accurate means of ascertaining the compressibility of the arteries as being so intimately associated with the condition of the capillaries, influenced, as we know these to be, by consciousness or the emotions, opens to physiology a field of inquiry which may prove of great value. .

To decide the extent to which sorrow, or love, or hatred, or anger, may affect the circulation and produce disease, is assuredly important, recognizing, as we do, their influence in this direction; and to ascertain by *any* means the influence of excitement and anxiety, prolonged as it is for months and years in this country among certain classes, is to gain an element of prognosis of human life.

To sum up the value of ascertaining the compressibility of the artery, and at the same time the meaning of the sign itself, we have—

1st. A means of obtaining and translating with approximate accuracy the record of pulsation.

2d. We may ascertain through this the condition of the sympathetic and cerebro-spinal system.

3d. We may learn the condition of the heart as to ability to perfectly perform its functions.



4th. We may by it learn the condition of the arteries, capillaries and veins.

A simple experiment relative to the effect of interference with venous circulation, and consequently with that of the capillaries, and in their turn the arteries themselves, may be worthy of record, even if for no other purpose than reference.

A ligature was drawn tightly around the forearm of a man whose tracing was first found to be normal, and writings taken at intervals of one minute.

The first of these, as may be seen (fig. 1), instantly



exhibited a reflected irritation, the first or shock-wave being prominent, although the amplitude is but slight and the tension 2°.

The second shows a slight increase of this, with diminished amplitude and greater frequency—the recoil wave more pronounced.



The third shows the beginning of tension due to the accumulating blood.





The next gave no well-developed writing, except under a pressure of  $5^{\circ}$ —and in this the first and second events alone are visible, the recoil being slightly indicated but the artery failing to free itself before the next systole.



In the fifth, less pressure seemed to be indicated, probably because of the rapid accommodation afforded by the deep veins—other features remaining the same.



One minute later the tension was still farther reduced, and under a pressure of  $2^{\circ}$  the characteristic waves of an ordinary record begin faintly to appear.



At this time it should be remarked, however, that the artery yielded tracings at  $5^{\circ}$  with readiness, but not differing from the one given, except in amplitude.

This experiment, while having no particular significance, because involving only a partial obstruction of venous and capillary circulation, may yet be of interest as affording evidence of the rapidity of the accommodating powers of nature, and the ease with which we may ascertain them.

## PART II.

### CHAPTER I.

#### THE PRACTICAL APPLICATION OF THE SPHYGMOGRAPH.

THE ability of any instrument to indicate a departure from perfect health, whether capable of also indicating the precise character of such departure, or not, would stamp it of practical value, just in proportion to its power to do this alone, or more certainly, or better, than could be done by other means. There are many reasons for believing that the Sphygmograph will do all of these; that it will indicate a departure from perfect health, when not ascertainable by other means, is apparent in cases of degeneration of the texture of arteries; and if, as suggested by modern pathology, "the earliest beginnings of what may be called degenerative disease consist in structural alteration of the minutest arteries," this fact alone would be of inestimable service. Prognosis in certain diseases, the estimation of longevity, the calculation of endurance in prolonged mental labor, and the danger of such labor where certain inheritable diseases are to be avoided, would find in it a valuable indicator.

It is at once evident, that could we satisfactorily determine the variations compatible with health, the

Sphygmographic record of an applicant for life insurance would be the safest record he could present as a test of his condition; and this single feature could hardly fail to be of great pecuniary value in a country where the assurance of life is almost universal. Those who know and lament the multitude of recklessly-made or ignorantly or fraudulently-made certificates of soundness, are aware that hundreds of thousands of dollars are annually sacrificed that might be saved by some such means.

It is believed that in the charts presented will be found most, perhaps all the variations due to other influence than disease, although still further investigation is essential to establish arbitrary rules with regard to them. Many observations in cases of known disease, or where it has been suspected, and impartial comparisons with a view to arrive at truth, will also be found in detail.

To the professional reader, who looks over a multitude of sphygmographic tracings, the first impression is not infrequently one of disappointment. There is a sameness at first apparent, which would tend to suggest the inefficiency of the instrument as a means of diagnosis, or even of ordinary usefulness; but such is also the case with the hieroglyphs of Egypt, the characters of the Chinese and Japanese language, or even with the facial features of a barbarous

nation ; yet in one case as in the other, upon every minute angle or curve, there is a significance, and careful scrutiny or maturer knowledge will reveal it.

That there is a peculiarity in each tracing is best seen by taking one of any kind, except the smooth uninterrupted wave of exceptional health, and comparing it in succession with others arranged upon a chart. Frequently fifty, sixty, or more, will be passed over, and no satisfactory similarity appear. This, however, it should be remarked, is not the case, if, confining ourselves to what we have hitherto discussed, we compare particular points in tracings, for example : similarities in venous or arterial pressure, in amplitude of systolic wave, or suddenness of diastolic collapse, etc.

Although the tracings originally presented with this essay have been reduced in number, from 1,000 to 275, yet even so large a number as the latter will perhaps seem superfluous, if judged from the standpoint of our present limited knowledge, and looking only for the features enumerated ; but as in the details of interesting cases the most useful facts are often elicited, so with cases whose clinical significance is recorded by the impartial pen of the Sphygmograph, only in details can be furnished the information we seek, and of these the student can for himself judge the practical value.

These tracings are designedly arranged in a somewhat promiscuous manner; they are selected from among several thousands, and though incomplete and unsatisfactory in many instances, the enormous extent of the field of inquiry to be thus explored, the maze of uncertainty and doubt that has surrounded the efforts of workers hitherto, and the fact that each disease should require weeks and months of patient investigation, must be the apology for such incompleteness; it is a necessity growing out of the magnitude of the work.

The whole practical value of the Sphygmograph can, in fact, only be ascertained by the completion of a dictionary, to which each individual tracing can be referred for interpretation, and towards this object these tracings are a contribution.

Another reason for presenting, in such profusion, tracings not at first strikingly dissimilar, is that to the reader or student may be furnished the amplest means for study of their value.

Careful scrutiny and comparison are invited, since the more minutely they have been studied by myself, the more firmly has the conviction grown that our present attempts at translation are defective, and that there yet may be found new keys that will unlock features of new interest. The difficulty of finding a tracing to perfectly correspond with one we may wish

to translate has already been referred to, but is made remarkable by the fact that the tracings of any one individual always indicate a singular resemblance, however great the interval of time, provided, of course, that no new or greatly exaggerated disease shall have intervened. This resemblance is suggestive of the features of the man himself, changed by the form of the beard, the advance of years, or the defacement of illness or trouble, it is yet the face of the same man and rarely loses its peculiar characteristics.

To make the study of these and similar records of value, certain rules should be observed, e. g. tracings taken at *different pressures* ought not to be compared. (This was done on the charts originally presented, but solely for illustration.) *Single tracings* should not be compared, but the several tracings of each sitting should be combined.

It should not be forgotten, that as tracings at different pressures cannot be *all* characteristic of the condition at the time, where several are found differing materially, only that should be considered significant which brings out the most fully the different elements of the pulse wave.

---

NOTE.—All the tracings herein given are from the radial arteries, not copies or fac-similes, but the tracings themselves as they fell from the instrument.

## CHAPTER II.

### DESCRIPTIVE NOTES IN CONNECTION WITH TRACINGS.

As already stated, one of the first steps in the application of the Sphygmograph to physiological or pathological study, is to ascertain the variations compatible with health. To do this, numerous examples have been selected, in which a rigid examination by the ordinary appliances of modern science failed to detect organic disease, and observations of these are given as made under different circumstances.

The first two tracings (Nos. 1 and 2) are those of a physician of middle age, in robust health.

The even wave, at a normal pressure, is a satisfactory index of the condition of the heart and general circulation. At a greater pressure, after exertion and excitement, there was a prominence developed in the wave of recoil. At a still greater degree of pressure, and after loss of rest and fatigue, there appears a suspicion of disease. (No. 2.)

Reflecting, however, upon the influence of nervous prostration in producing capillary contraction, and slight increase of arterial tension, and that the roundness of the systolic wave when resulting from disease, generally accompanies a much *higher degree* of arte-



rial tension, the tracing may be considered not inconsistent with health.

A comparison may be made with other tracings, e. g. No. 180, of a man who exhibited certificates to the effect that he was suffering from immense aneurism of the abdominal aorta, and is interesting as corroborative testimony that the man was an impostor; certainly his tracing was indicative of *no serious* departure from health, and careful examination failed to detect the disease. (See Aneurism.)

Tracings Nos. 3 and 4 are the record of a young man addicted to the excessive use of tobacco. The perverted nervous element in the wave of primary shock, and of recoil, are the only features of interest.

The same exhibition from a different, yet analogous cause, is seen in the writings of Asthma. (See Asthma.)

Tracings 5, 6 and 7 are from a gentleman mentally overtaxed, but in whom no organic disease could be found.

The next tracings are illustrative of the influence of various minor disturbing causes. The first (No. 8) appears to show the smooth wave of health at a pressure of  $0^{\circ}$ . The exertion of running up stairs quickly made a variation in arterial tension of  $2\frac{1}{2}^{\circ}$ . The smoking of a strong cigar also varies the tension to a slight extent (No. 10). Smoking to faintness at once reduces



this to  $0^{\circ}$ , and modifies the tracing to an extent, showing impairment of the heart's propulsive power (No. 11).

A full meal does not appear to influence the tension of the artery, nor, indeed, to modify the record of health first given, except as to frequency. The same, with wine, however, changes it as to frequency, amplitude, rhythm, and tension (No. 12). Under a less pressure there appeared a slowness of collapse of the artery, but no other change.

After exciting news a change occurs, almost like that due to faintness, and probably explainable in the same way, although the pressure differs (No. 13). Anger, however, an emotion similar to that of surprise and excitement implied in the former example, while not modifying the tension of the artery, exhibits the increase of excitement in the heart itself without the discharge of any increased volume of blood from its aortic orifice; an event, however, which would probably result at a later period, if the emotion were prolonged (No. 14). The last two examples, taken during a condition of fatigue, will probably need no additional comment (Nos. 15 and 16).

The following cases, also of apparent health, show the effects of obtaining a correct estimate of pressure employed in the observation, and the possible significance of a former disease. Please observe, *these are cases of apparent health only.*

Tracing No. 17. A suspicion of cardiac complication, growing out of rheumatism, is indicated in the tracings of this case, as brought out by the increase of pressure upon the instrument up to 2°. The patient, a male, age 30, had frequently suffered from cough and suggestive evidences of tendency to pulmonary disorder; yet, although delicate, he could not be said to be actually ill.

Tracings 18 and 19 exhibit nervous elements, due to widely different causes, and, in 19, actual valvular disease has been since detected.

Tracing No. 20. This tracing is the record of a man in apparently robust health, yet occasionally subject to pain over or in the apex of the heart. No lesions could be detected by examination. At the age of 25 he had raised blood on several occasions, but, neither at the time nor subsequently, was there any cough.

A man of nervous energy and business talent, he has attained prominence and wealth by his own exertions.

Tracing No. 21. This is the record of a lady, age 50, subject to attacks of suffering from a chronic ovaritis, but whose lungs were found to exhibit evidences of former and somewhat serious disease.

Tracing No. 22: This case is one of considerable interest, since, although to all appearances in vigorous health, any confinement at in-door work invariably

produces debility and cough. A man of about 42, of sanguino-bilious temperament, accustomed to travel and to out of door pursuits; he maintains a condition of apparent health, the only exception to which, is a trivial indigestion and follicular pharyngitis. Fifteen years ago he suffered from hæmoptysis, the origin of which is faintly suggested by impaired vesicular murmur at the apex of the left lung, with scarcely appreciable dullness on percussion.

Tracing No. 23. Miss G., age 18, of ruddy complexion, of petite form, vigorous and well. No organic disease could be detected, and the occurrence of palpitation and simple functional disorders alone existed, probably due to inordinate dancing.

Tracing No. 24. Mr. J. R., age 30, phlegmatic temperament, addicted to abuse of tobacco, and subject to slight cardiac disturbance.

Tracing No. 25. Mr. M., age 32, sanguino-nervous temperament, robust and vigorous, but suffering occasional cardiac disturbance from abuse of tobacco. The condition of nervous hyperæsthesia and its influence in producing tension, shock wave, and wave of recoil, are plainly indicated in the writing. This case may be compared with one of suffocative bronchitis, being singularly like and yet unlike (No. 26). It is not improbable that the condition of the pulmonary circulation, arising from the suffocative bronchitis un-

der which the patient labored, may be the cause of the prominent recoil wave, and indicative of obstruction sufficient to react on the right ventricle, and so through the left upon the systemic circulation.

Tracing No. 27, is that of a gentleman, Mr. H., age 23, pale, nervous and debilitated, and exhibiting the marks of other excesses than tobacco, to which, however, may be attributed the principal amount of nervous depression. The marked difference exhibited by the tracings of such a person, whose arterial tension was not abnormal, and the preceding, is of interest.

The indication is simply that of reaction after prolonged nervous excitement.

Tracing No. 28, Mrs. V., age 34, married, and to all appearance and examination sound, with the exception of anteflexio uteri and globus hystericus. The comparison of this with cases of disease, can only be reconciled by the fact of difference of pressure.

A singular resemblance of the record to one common in obstructive valvular disease, but which it is unnecessary to give in this connection, shows several facts already alluded to in the preceding pages. First, that obstruction at or near the heart will produce a prolonged and flattened systolic wave, as marked as may be produced by obstruction more remote; and second, that the wave of recoil, when co-

existent with such a systolic wave, means, *except when the tension is great*, organic disease.

Were this exception not true, the records of Nos. 25 and 26 would seem to mean organic and not functional change.

Tracing No. 29, Miss P. W., age 26, suffering from debility, ascribed by herself and friends to simple nervous derangement, came under observation for a supposed cancer of the uterus, having seven months previous, undergone the torture of removal of a benign growth from the right breast by caustics at the hands of a charlatan. This growth, there is abundant testimony to prove, was of long standing, painless, not growing and *not* cancerous. No uterine disease whatever was found, nor indeed, any other organic trouble; the chief and only symptom of note was a pulsation of the abdominal aorta when the patient was lying on her back, sufficient to be perceived across the bed chamber and to lift the bed clothing.

The tracing is of the right radial. The abdominal aorta and other radial gave a similar record, varying only in amplitude.

The feature of interest in this case relates to diagnosis. From the tracings obtained, the opinion was given to the relatives that no organic disease existed, but that the pulsation was due to deranged nervous action, probably of the tri-splanchnic system, and that

the disorder would disappear under a simple course of tonic treatment.

Subsequently this opinion was verified by the recovery of the patient. The case of cardiac disease in the patient with phlebectasis laryngea, (already alluded to in connection with description of the 4th event, see No. 64,) while similar, yet differs in essential points, and illustrates by its recoil and primary shock wave, occurring with flattened systolic distension and low compressibility, the existence of organic disease. In the former case the backward inclination of the primary ascent would indicate a singular predominance of some nervous element.

Tracings 30 and 31. These were both apparently healthy men of 30 and 33 years of age, respectively, who had lost each the left arm some years before. Taken as extremes of difference in cases of men free, to all ordinary modes of detection, from organic disease, they show that in both there was departure from perfect health. In the first, more careful examination revealed a peculiar murmur with the cardiac systole, loudest over the innominate artery. The young man was found also to be suffering from malaise due to overwork.

The murmur has since become almost inaudible, but the tracings remain the same. How far the loss of arm may be the cause of the record it is impossible

to say. The other case, in which the arm had been amputated, exhibits the oscillatory motion of the blood in a normal tracing, due to the simplest of the causes assigned for this phenomenon, (see p. 72) viz: distorted inhibitory function; and in this case arose from an excessive nervous vitality and impatience to be away. The patient was a mail carrier, leading, of course, an out-of-door life.

Tracings 32, 33 and 34. These are designed to illustrate the variations due apparently to debility. The pressure, it will be seen, is slight. While many other changes in tracings are undoubtedly the results of debility, these have been selected as more frequently occurring than others. Household cares, prolonged anxiety, the bearing of children, etc., seemed to have been the cause of the impairment of health.

Tracings 35 and 36. These tracings, from an hysterical female, exhibiting a high degree of arterial tension, were unaccompanied by any evidence of disease, whatever; the person being a young lady, age 18, vigorous and sound so far as a most rigid examination could show her to be so. The high tension was ascribed to functional disturbance, although the lady's father and other relatives have suffered from cardiac disease.

Tracing 37. This is from a lady subject to hysteria, but, unlike the preceding, *not* otherwise sound;



a prolonged leucorrhœa and displacement of uterus having induced a condition of impaired health. She was married and the mother of several children. The tracing is, however, submitted as that simply of hysteria.

Tracing 38. This exhibits the injury to the nervous system that may arise from excessive use of tobacco ; the person being a thin, delicate male, aged 33.



### CHAPTER III.

#### CASES CHIEFLY OF CARDIAC DISEASE.

Tracing No. 39. Mr. C., age 24, has suffered from much cardiac disturbance, faintness, palpitation, and, at times, slight irritative cough. The low tension, the nervous element, and diastolic murmurs are chiefly marked, and were connected with capillary relaxation, due to dissipation. An existing increase in cardiac impulse does not appear in the tracing, probably because not transmitted as far as the radial artery. The patient has since recovered.

Tracing No. 40. A man, age 68, with all the external and familiar evidences of advanced cardiac disease, and with the double beat of the heart faintly perceptible in the peripheral arteries. The irregular form of the tracing is a point of interest, not hitherto dwelt upon in this essay.

Prof. Sanderson, in his work on the Sphygmograph, p. 35, describes the peculiarity for the first time, and ascribes it to the mechanical effect of inspiration during a mitral disease, accompanied by regurgitation. Such it probably is in this case, the short and ineffectual beats occurring during inspiration, the others

during the respiratory pause. He speaks also of a similar pulse due to certain dyscrasiæ, but, as I have thus far failed to observe it, time need not here be taken to dwell upon his brief remarks concerning it, particularly, as the dyscrasiæ referred to are not specified, nor tracings given. He, however, ascribes the failure of the heart, as evidenced in the short beats here given, to the non-closure of the mitral valves at the time of inspiration, and their partial or perfect closure when the relaxation of the pulmonary capillaries, during the respiratory pause, allows the auricles to free themselves sufficiently from their state of distension to permit the valves to fall together. Another and most interesting case of this disease is given in connection with tracings 74, 75 and 76.

It should be remarked that these changes in amplitude of the waves occur when the regurgitation and other disease are such that the valves are not permanently kept open. In the latter cases, the valves failing to close even during the respiratory pause, the efforts of the heart are *all* short and ineffectual. The effects of stenosis of the mitral valves, or such obstruction as to interfere with a perfect and rapid filling of the ventricles from them, would, of course, present different tracings, examples of which will be hereafter given.

Tracings Nos. 41, 42, 43 and 44. These are from a

case of threatened apoplexy, in a man with pre-existing baso-systolic murmur, showing influence of treatment and relief of vertigo. Mr. O., age 52, of florid complexion, short neck but not particularly apoplectic in appearance, formerly a butcher, for two years book-keeper, and for many years robust and well. Having been, for a year, subject to slight attacks of dizziness, he came under observation when these had become alarming, and so severe as to seriously interfere with business. Twelve years prior to this he had suffered from subacute attacks of rheumatism, but never supposed the heart implicated in any way.

The subjective condition was as follows: Vertigo upon slight exertion, no numbness or tingling or especial headache, no impairment of sensation or motion. Recovery in two months from date of the first tracing given. Treatment: cardiac and arterial depressants and rest. The baso-systolic murmur was slight, and the patient is yet unaware of its existence. The difference between the tracings, under similar pressure, is probably due to easily aroused nervous apprehension. Tracing No. 44 exhibits the result of treatment.

Tracing No. 45. This was a case of vertigo and threatened apoplexy *without* heart disease, the impairment being functional. The patient was a young girl, age 17, assistant to a dentist, who exhibited similar

symptoms to the preceding, but to a worse degree. Treatment the same, and recovery speedy.

Tracings No. 46, 47, 48 and 49. The record of this case is given somewhat in detail, because of the easily ascertained associate symptoms, and a personal knowledge of the patient many years. It is that of a man 66 years of age, having the appearance of vigorous health, indeed, confined to the house but once for a few days for fifteen years; hardy, muscular, and enduring, with the appearance of a person many years younger. The tracings were taken at varying intervals, during the past two years. Formerly, and within three or four years, murmurs, both with first and second sound of the heart, were audible; and the exaggerated impulse, increase of area of dullness, changed position of apex, etc., indicated hypertrophy accompanied by disease of aortic and intra-cardiac valves. As this enlargement has advanced, the murmurs have diminished in intensity, the impulse has grown less, and the frequency, formerly singularly reduced, (to 42 beats per minute), has increased, so that, at times, it will be found 60 or even 70 beats per minute.

The change that has occurred may be, in some measure, discovered in the comparison between the tracings.

Those taken at 2° show what variations may occur

in the same individual during the progress of organic disease.

It should be stated that, whereas, formerly (tracings not given) a pressure of 5° was necessary to obtain an ample tracing, the gradually impaired expulsive power of the heart has made such pressure, only on one occasion, allowable within the past two years. The artery no longer has the firm, cordy feeling then exhibited, although the patient is remarkably free from external evidences of degeneration, such as noticeable arcus senilis, etc.

One other feature of interest appears, viz: the suggestive resemblance, in one or more of the tracings, to the records of aortic regurgitation. In one instance only is it likely that this phenomenon occurred, and as it has never been repeated in the case, we may suppose that the obstructive disease of the valves, which undoubtedly exists to a slight degree, may have permitted a *temporary* regurgitation.

Improbable as this statement may be considered, the *record* is impartial, and the sudden collapse of the artery, from some cause, is indisputable. It is hardly, I think, to be confounded with oscillation.

The last three writings, taken at the same date, showed the importance of not accepting a single tracing, at a low pressure, as the true record of a patient; one of these, however, only is given.

Tracings Nos. 50, 51, 52, 53, 54 and 55. This case is one of pericarditis with effusion, and is of peculiar interest. It may be briefly stated, as follows :

Mr. —, age 25, of average height and weight, and dark complexion, had been annoyed for a considerable period by a cough, to him significant and alarming, because of a supposed family predisposition to affections of the lungs. After resorting to cod liver oil and expectorants, *et id omne genus*, he came under observation, somewhat weakened, and suffering from occasional slight fever. No disease of the lungs or heart could be discovered, and a chronic pharyngitis, with partial involvement of the larynx down to the ventricular bands, seemed to be the sole source of trouble. The disease of the pharynx was of the follicular variety ; that of the larynx, as would be naturally expected, glandular. No pyriform enlargement of the ary-epiglottic folds, nor other suggestion of incipient phthisis. For a real or fancied pain in the chest he smeared the whole of the front of it with croton oil. In twenty-four hours he was found with a severe urticaria, involving the whole body, and twelve hours later, with effusion into all the serous cavities of the body ; that of the joints considerable ; of the heart the least. Weakened by this disease or affection, and while the condition of the heart was far from satisfactory, he went into the country for his health,

and resorted to prolonged and violent exercise in rowing, etc., with the effect of bringing him speedily to bed, with a thoracic pain and increased pericardial effusion. During the labored action of the heart, a stasis was discovered in the apex of one lung, and a circumscribed pleurisy followed. Most rigid examinations, frequently repeated, warranted the belief that this was a result of the heart's condition, and the opinion has since been verified by the perfect recovery of the patient. Before the effusion into the pericardium had been absorbed, an endo-cardial inflammation occurred, and, as convalescence began and continued, it was evident that hypertrophy would result to a greater or less degree.

The cough, which had thus far been annoying rather than painful or distressing, continued, and when finally the treatment of the intra-thoracic disorder could be abandoned, local treatment under the laryngoscope completely removed it. After so great a lapse of time, however, (June to September,) the upper part of the trachea had become involved and required especial attention.

Dec. 1st, 1872. The lungs were found free; pulse under the finger normal, but with the Sphygmograph indicative of weakness of the heart's action. The same tracing resulted from observations at any pressure from  $0^{\circ}$  to  $5^{\circ}$ . The last tracing, unusual and



peculiar, has been quoted on chart opposite page 45. The whole case is worthy of study, and from a sphygmographic point of view might occupy a complete essay.

Tracing No. 56. This is the record of a man, age 50, in the dropsical stage of cardiac hypertrophy with regurgitation. This tracing resembles strongly that usually given by the carotid, (see p. 75).

Tracings Nos. 57, 58, 59 and 60. This case is that of a fireman, with slight hypertrophy and baso-systolic bruit, and exhibits the effect of treatment. The patient seems since to have recovered. Aside from the cardiac murmur with occasional palpitation and dyspnoea, the party suffered from sleeplessness, for which trouble he came under treatment. The relief of this by remedies permitted the development of a tracing quite different from any in the *first* series, but giving no indication of the cause of a systolic bruit at the base of the heart. The suggestion would rather be that of some mitral trouble, if valvular at all. The facts only are stated, and the diagnosis of slight hypertrophy with dilatation was made with no reference to the tracings. I have no doubt, that with greater experience and care, more satisfactory tracings could have been obtained. The greater frequency of the pulse after treatment is remarkable, in connection with the fact of complete relief from all unpleasant symptoms.



Tracing No. 61. A case of Hypertrophy (concentric), with exaggerated impulse sufficient to give thrill to the hand over the whole chest, a systolic murmur at the base of the heart, and occasional hæmoptyses without tubercle. After what has been said concerning similar cases, this one need not be dwelt upon, save to call attention to the slight pressure permitted by the artery.

Tracings No. 62 and 63. This case, that of a young lady, age 23, is interesting and worthy of a brief notice, because exhibiting the flattened wave partly due to the conjunction of the first and second events; but chiefly to the prolonged effort of the heart to force its contents into the aorta against some obstruction at the orifice of exit.

This wave aptly illustrates the description of the condition given by Blakeston (Observations on Dis. of Chest. Amer. Ed. p. 225), in which the blood is said to be *gradually squeezed* through the contracted orifice. A case of aortic valvular obstruction.

Tracings Nos. 64, 65 and 66. In this the same condition as the preceding, is shown with an accompanying regurgitation. This case possessed many features of interest which cannot be given in detail. The principal source of trouble, for which alone relief was sought was a sense of fullness in the larynx, which was always relieved by a local application. The dis-

ease of this structure was probably due to the cardiac trouble, and, in fact, led to an examination of the heart, of the condition of which the patient was aware.

Tracings No. 67 and 68 continue the case, the progress of which was watched with considerable interest, the heart having grown steadily more troublesome. At the present time, however, after a prolonged rest, all very unpleasant symptoms, with exception of occasional slight faintness upon exertion and nervous chills, have disappeared. The results obtained by varying pressure are worthy of note.

Tracing No. 69, of a man *supposed sound*, but subject to occasional vertigo, (age 56,) may be compared with advantage.

Tracings Nos. 70, 71, 72 and 73, may be briefly described as those of a young man (age 30), with disease of mitral and aortic valves, and hypertrophy (concentric). The confusion of sounds in the chest is indescribable; and although the party has the ruddy appearance of health, these sounds, like the rushing and tumbling of many waters, can be heard when the observer is sitting close beside him. A regurgitant mitral murmur can alone be separated distinctly from the confused mixture of noises. The patient had been, prior to 20 years of age, a sufferer from frequent attacks of inflammatory rheumatism. The most inter-

esting subjective feature in his clinical history is his liability to attacks of extreme dyspnœa immediately after any exposure to draughts of cool air, or the wetting of the feet, etc.

Tracings Nos. 74, 75 and 76 are of a young lady, age 18, in whom, for eleven years, some heart disease has been known to exist. Of fair complexion and rosy cheeks, she presented to the eye no evidence of disease, yet, by auscultation and percussion, it was a matter of no difficulty to locate the seat of a serious organic change in the left side of the heart.

The tracing is a good example of that form of disease already discussed on p. 101, see tracing No. 40, and differs from the case there cited, but little, in extent of organic change. In neither, as will be observed, is there as yet any failure to fill the arteries, and while a pressure of  $5^{\circ}$  is necessary to bring out in perfection the peculiarities of the writing in the latter, (a low or normal pressure hardly suggesting the existence of the regurgitation that is so evident in the other records), yet, in the case above referred to, on p. 101, a pressure of  $0^{\circ}$  only could be tolerated, and the accompanying symptoms indicated a *more advanced stage* of the disease. Had the amount of regurgitation been more excessive in one than the other, we should probably have had *all* the waves exhibiting evidences of inefficiency in the tracing,

instead of every second and third. It is not unlikely that nervous or tendinous tremor is the source of the apparent oscillation in the second record of the series, since it is so nearly obliterated from the one that follows, under an equal pressure, and as we know the influence of nervous excitement upon a person suffering from this disease, we may correctly attribute the increased tension, also to it. Singularly contrasted as the successive waves are, the pulse to the touch but faintly suggested irregularity.

Tracing No. 77, exhibits a suggestive abnormality to which, however, the most careful physical examination gave no corroborative testimony. The patient, a young lady, age 26, of superior intelligence, believed herself to have inherited some affection of the heart from her father, her pulse having for several years been above 95. No increased area of dullness and no murmur existed, nor was the rhythm, impulse or pitch of the valve sounds at all modified. The similarity of the record, however, to that of No. 72, is interesting, in view of the family tendency to cardiac disease, and the patient's habitually rapid pulse. It may be remarked that she was and has been for years in otherwise robust health.\*

---

\* Since this record was made the patient has suffered from attacks of alarming syncope.

## CHAPTER IV.

### AFFECTIONS OF THE NERVOUS SYSTEM.

Tracings Nos. 78, 79 and 80. This case was that of a large, well developed, vigorous man, taken during convalescence from mania-a-potu, or rather after the most violent symptoms were brought under control by treatment. These tracings are types of those obtained under similar circumstances, but differ materially from those given in Reynold's System of Medicine, by Prof. F. E. Anstie. What may be the cause of this discrepancy I am unable to say; but as my object now is simply to give the reader the results of personal observation, any attempt to reconcile them would be out of place. It will be observed that the amount of pressure in this case does not vary perceptibly the amplitude of the tracing.

A Sphygmographic observation taken later, gave only a low, wavy tracing, showing extreme nervous debility.

Tracing No. 81, is that of a man of 56, *supposed* well, but in whom the second sound of the heart has a peculiar intensity. He is subject to vertigo, and undoubtedly is, to some extent, unsound.

Tracings Nos. 82, 83 and 84, are examples of similar troubles; and being in no wise peculiar, time need not be occupied by further comment, save that the latter being the record of a hard drinker, quite recently a sufferer from sun-stroke, exemplifies the remark on page 73, that oscillation may be due to either "severe cerebro-spinal disturbance" or "blood poisoning," both of which existed in this case.

## CHAPTER V.

### CASES OF ASTHMA, AND VARIETIES OF SAME.

Tracings Nos. 85, 86, 87 and 88, are from a patient, a male, age 33, laboring under an asthma, complicated with bronchitis—a true suffocative bronchitis. The first two exhibit the combined respiratory act. The period of observation lasted from August 20th, the date of commencing treatment, to Sept. 16th, at which time all asthmatic symptoms had been relieved, and the subacute bronchial inflammation was progressing rapidly toward recovery. A state of excitement of the nervous system is evident during the activity of the disease, and one of cardiac asthenia during convalescence.

Tracing No. 89, is that of a young girl, age 9, who for six years has suffered occasional attacks of asthma. She shows, under physical examination, evidences of slight dilatation of the right ventricle, and has the asthmatic shrunken chest. She has suffered from frequent palpitation of the heart and insomnia.

Tracings Nos. 90 and 91, are the record of a life-long sufferer, age 56, who has since died. At the time of examination, being very weak, he was found to

have excessive dilatation of the heart, and double emphysema. A distressing dyspepsia added its tortures to his disease. The attacks of asthma had been nightly for thirty years, with very rare exceptions.

Tracing No. 92 is a case of *Autumnal Asthma*, accompanied usually by bronchitis in a severe form, but this year with but slight implication of the bronchi. A male, age 40, a brewer. A curious fact in this case is worthy of record. Each year, after recovery, he has for several years voided urinary calculi (mulberry variety) in considerable numbers, although no symptoms have ever pointed to the kidneys as a source of trouble at other times, and never during the paroxysms. The record was made during the day, the attacks being usually at midnight or shortly after.

A high degree of pressure was necessary to produce an ample and satisfactory tracing.

Tracings Nos. 93 and 94 represent the record of a robust man, age 32, for five years a sufferer from true *uncomplicated asthma*; attacks diurnal, sudden, protracted and severe.

In this, as in all cases where not otherwise explicitly stated, the tracings given were taken before the use of remedies, and during the day.

Tracing No. 95 is from a lady, age 32, suffering from *cardiac dyspnœa, supposed to be asthmatic*.



The heart is hypertrophied, the apex beat being above the fourth rib, and displaced  $2\frac{1}{2}$  inches to the right; systolic sound double, and diastolic very sharp at the base and also at the apex of the left lung. (The urine in this case was found on several occasions highly albuminous.)

Tracings Nos. 96 and 97 are from a robust man, age 42, with ordinary *autumnal asthma*, beginning, as is usual in such cases, in August of each year; no marked complications.

Tracing No. 98 was similar to the preceding as regards the age of party and character of the disease, but differed in being *not* autumnal. The patient, a sea captain, has been long subject to slight bronchitis, with asthmatic difficulty of breathing, whenever remaining a few nights on shore. He was found to have consolidation, without softening or outward symptom, at the apex of the left lung.

Tracings Nos. 99 to 111 inclusive, are examples of supposed progressio-loco-moto ataxia. In all of them there seemed but little doubt as to correctness of diagnosis, and in the first two (99, 100, 101, 102, 103, 104, 105 and 106,) no corroborative symptom was wanting. In the others the impaired co-ordinating power, the severe neuralgic pains, the duration of the affection, the occasional ptosis and the limitation of the distinctive phenomena to the lower extremities,

were present, and the absence of any symptoms pointing to other cerebral or spinal disease, seemed to warrant the diagnosis given, although the youth of one of the parties was somewhat against the correctness of the opinion.

(Case 99 to 101 inclusive.) Mrs. B., wife of Judge B., aged about 50, ill five years; duration of marked inco-ordination of motion one and one-half years.

(Case 102 to 106 inclusive.) Mr. G., age 52, duration of illness, six years. The first two tracings were taken October, 1872, the next a month later and the last two a month later still. In November the record states that "Strabismus and persistent ptosis" existed.

(Case 107 to 109 inclusive.) Miss J., aet 18, ill four years; unable to walk three years past.

(Case 110 and 111.) Mr. E., age 26, ill three years.

All the cases are yet living, that of (case 102 to 106) alone showing the approach of the end; and in each without exception, (although the fact has no bearing upon our present subject,) it may be interesting to note that amelioration and relief has followed the use of large doses of ergot and phosphoric acid. From a Sphygmographic view, several points of interest may be noted. *First*—In two of the cases, it was almost impossible to obtain similar writings from the right and left radials.

*Second*—In the two cases most advanced, a degener-

ation of the arterial tissues, or at least the impairment of their elasticity, is indicated.

*Third*—The record of the young lady, age 18, (107, 108, 109) exhibits the least aberration from a healthy standard, and a favorable prognosis based upon it alone, although made after long treatment, under other physicians, and much discouragement, has been verified in the rapid improvement of the patient. The similarity of the tracings to those taken from my own arteries, while under the influence of certain nervous sedatives, is well marked.

*Fourth*—The record of Mr. E., age 26, (110 and 111) while failing to justify a favorable prognosis, because of the evident impairment of the impletive power of the heart and the inference of severe cerebro-spinal disorder, drawn from the oscillation of the writings, is yet instructive. Under the treatment already indicated, combined, however, with remedies required for a distressing insomnia, the patient has so far recovered as to be free from the boring and neuralgic pains, is able to walk about with no great difficulty, to sleep and eat with the appearance of returning health.

It is by no means designed to intimate that these cases are destined to ultimate recovery; but only to emphasize the fact that the organic and structural change appeared in them less advanced than in the others. The languor of the systolic action of the

heart, as evidenced by the slope of the primary ascent of the tracing ; the irregularities of rhythm ; the variations in frequency and pressure ; the tendency to an oscillation in no measure due to tendinous or muscular tremor (because none existed), may all be set down as marks of a serious organic derangement of some kind.

## CHAPTER VI.

### SINGULAR CASES.

Tracings Nos. 112 and 113. The tracings of this patient are not easily explained. A saloon keeper, age 35, and for years never ill. He was taken with chills, accompanied by alarming symptoms indicative of congestion of thoracic organs. The tracings were taken during the intermission. The paroxysms seemed without reasonable room for doubt, those of quotidian ague, running somewhat rapidly into a remittent fever. This became again intermittent under treatment, and recovery followed within three weeks.

The resemblance borne by the tracings of this case to many heretofore tabulated is somewhat remarkable; and as the changes in the records since recovery still show some abnormality, it is not unlikely that the heart at least has sustained severe damage. To all appearance, however, recovery has been complete.

As this has been the only case of the kind, of which I have obtained records, it is unfortunate that no proper comparisons can be made. The whole number of tracings made in this case, however, was perhaps forty.

Tracings No. 114, 115 and 116. This is the record of a case of schirrhous of the breast, which caused death by exhaustion, three years after its discovery, and without operation (if we except an attempt to cure by electrolysis.)

Tracings Nos. 117, 118, 119 and 120. Mr. C., age 32; until quite recently subject to epilepsy. At the time of observation with the Sphygmograph he was suffering from acute enteritis.

The amplitude of the tracings under all pressures is singular, as also its resemblance to the writings obtained in organic disease of the heart. There can, I think, however, be but little doubt that no regurgitation is indicated, but that whether we regard the many waves as due to oscillation or the presence of waves of recoil, the translation probably is that high arterial tension and some occult cerebral affection are indicated.

The presence of a marked dirotism in the tracings of epileptics is noticed by M. Voisin, in the Biennial Retrospect of the Sydenham Society, 1867-8, p. 471, but as the tracings themselves are not given, we cannot determine whether the waves were really those of the fourth event, of recoil, or of oscillation. An apparent verification of the opinion above expressed seems to be afforded by similar tracings among those of asthmatics which may be compared.

Tracing No. 121. Mrs. C., age 50. This patient came under observation for a chronic ovaritis of years standing. Examination of the whole body revealed no other *active* disease, but an impaired condition of one lung, due to a former disease, at the apex.

The tracing under a pressure of 2° would suggest either degeneration of the arteries, of which no other evidence appeared, or of obstruction to circulation at or near the heart. Whether we ascribe it to the former or the latter, two things are certain; there was obstruction to free pulmonary circulation, as well as that which grew directly out of the congestion of the ovary, and as there was no evidence either of perverted inhibitory function influencing the capillaries, nor yet disease at the aortic orifice, which would probably have shown itself by a more sudden descent from the flattened apex of the tracing under the pressure recorded; and as moreover this kind of record is frequently met in local congestion, when not connected with too great inflammatory action, it is fair to attribute the appearance to the condition of obstruction indicated, viz: in the lung and in the ovary. Further inquiry and observation are necessary, however, to establish such a point satisfactorily.

Tracing No. 122, is that of a young man age 35, suffering from chronic rheumatic arthritis, with deposits in the joints of the fingers. The record was



made in the interval, between exacerbations of the disease; the patient being able to attend to business, and the deposits comparatively insignificant.

Tracings Nos. 123, 124, 125 and 126, are those of a lady age 26, suffering from metrorrhagia after confinement. In forty-eight hours after the last tracing, the record gave a smooth even wave, the patient feeling free from faintness, &c.

Tracings Nos. 127, 128, 129, 130 and 131, are those of a boy, age 6 years, suffering from acute Bright's disease. The tracings were taken during the stage of anasarca, the boy presenting the peculiar waxy color, characteristic of organic disease of the kidneys. Since the last tracings, the progress toward recovery has been rapid, and is now almost complete. (Dec. 20, 1872.)

The appearance of albumen and casts no longer exist in the urine, and the pulse is fast regaining its tone and fullness. On the first occasion, there will be noticed the interrupted efficiency of the heart, faintly simulating mitral regurgitation, together with the accentuation of the primary shock wave, or first event, and dicrotism under a pressure of 2°. On the next occasion, the predominance of oscillation in the blood current was singularly pronounced. On the next, and but three days later, a normal tracing appeared, (with exception of its frequency,) and under a normal degré of compressibility.



Tracings Nos. 132 to 146, inclusive, on the chart opposite, are those of a man, age 64, who for nearly a year had been suffering from gangrene of the foot, due as was supposed to degeneration of the arteries. In none of the tracings, however, was this apparent. Upon consultation, it was deemed advisable to remove the limb through the junction of the middle and lower third of the thigh. This was accordingly done, and the records exhibit the condition of the patient immediately before and after the operation. As may be inferred, his condition prior to the amputation was not particularly favorable, owing to the prolonged drain upon the system due to the nature and duration of the disease.

Aside from the history exhibited by the tracings and the appended notes, it may be briefly said that for several days after the operation, no reparative effort of nature was visible, but by the seventh day a line of demarcation was well defined a few inches above the end of the stump, and the increase of appetite and strength gave promise of recovery. By the twentieth day, however, it became evident that age and prolonged suffering had left no sufficient vitality to secure restoration to health, and he died of exhaustion on the twenty-eighth day after the operation.

Two inferences seem to me justifiable in this case, viz : that the disease was not due to any atheromatous

or other degeneration of the arteries, because none such appeared in the Sphygmographic record, and that the operation was therefore justifiable on the part of the operating surgeon ; and second, that inasmuch as some local affection of the artery probably existed, the operation might have proved successful, if this could by any means have been ascertained, and the amputation made high enough above it. The line of demarcation and the total want of any reparative effort in the stump, seemed to show that by an accidental selection of the point of operation, the disease was left above instead of below it.

These tracings exhibit greater varieties and better examples of the recording power of a Sphygmograph, than any given in this essay. The intermission shown in some of the tracings, and the prolonged fullness of artery, with oscillation and sudden collapse in others, are interesting.

Tracings Nos. 147 and 148, (impaired arterial elasticity; the patient a frequent sufferer from acute rheumatism, with no discoverable cardiac lesion as yet;) No. 149 and 150, (dilated heart;) No. 151, (laryngeal phthisis;) are introduced because the records of cases of considerable interest, but of questionable diagnosis. They are believed to be due to the diseases, however, indicated.

The first, for example (No. 147 and 148), was of a

man, age 55, who had been pronounced by various physicians to have both disease of heart and lungs. Subject to acute inflammatory rheumatism up to within a year, he yet manifested no outward signs of cardiac disease, and a careful examination failed to detect any organic disease whatever. There exists, however, evident impairment of elasticity of arterial tissues, and the man uses tobacco to an injurious excess.

Tracings Nos. 149 and 150 are tracings from a young female, exhibiting all the symptoms of dilated heart, and yet at times so free from them as to throw doubt upon so grave a diagnosis. The concurrence of several physicians, however, in the belief that such is the disease, and the careful observation of the patient for nearly two years, have appeared to warrant the belief that the diagnosis is correct. The case is of such variety in some respects, however, that it is unfortunate that it cannot be given in detail.

Tracing No. 151 is from a young man with laryngeal phthisis, with slight disease at one apex (no softening).

## CHAPTER VII.

### PHTHISIS.

The following tracings, Nos. 152 to 177, are those of cases of phthisis. Out of several hundred these alone are given, but the selection has been made to give as correct an idea as possible of the character of tracings usual under such circumstances.

The first patient (Nos. 152 to 155 inclusive) was a young man, who, when seen in February, 1871, had become debilitated by about three month's illness; softening of deposits having commenced in the apices of both lungs.

Treatment and general progress in the case are of a too familiar type, and need not be detailed. He was sent around the world, via Australia, and in March, 1872, returned, only to show immediate signs of progressing disease, which had apparently been quiescent while at sea. August 12, 1872, as stated in my notes, he had come to his bed, and suffered from hectic, night sweats, &c. August 24, 1872, he was cheerful and with good appetite, but failing rapidly, the pulse not bearing a pressure above 0° without obliteration. He died September 1, 1872.

Tracings Nos. 156 and 157 are the record of a young man, age 33, also with phthisis, but in a stage short of softening, the apex of one lung only affected, but the ary-epiglottic folds, showing the pyriform enlargement, common in phthisis pulmonalis, and the patient a subject of hæmoptysis.

Tracings Nos. 158 and 159, are from females of about 30, with advanced disease of the apices of both lungs, although not yet confined to bed. Minute record of symptoms, &c., are not given in connection with any of these cases; the object now in view being of too general a character.

Tracings 160 and 161, are from a young man whose condition may be best described by simply copying the notes taken at the time of an examination, some time previous to any marked symptoms of illness, except hæmoptysis. "Left lung—in front wavy, and interrupted inspiration and prolonged expiration, with dullness and absence of vesicular murmur as low down as the nipple. At the back, pronounced bronchial breathing above the scapula; and over a spot three inches in diameter at and below the angle, vocal resonance. Dullness most marked over the upper portion of the thorax. No crepitation or rales. Inspiratory and expiratory sounds the same as in front. Right lung—sounds normal with exception of slight dullness over the posterior portion of the thorax below the scapula,

apparently the result of previous inflammatory action.”

The tracings given were taken after the beginning of softening, some months later; all others being omitted because possessing no especial points of interest.

Tracings Nos. 162 to 166, inclusive, are those of chronic phthisis.

Cases 167-168, 169-170, 171, 172, 173, 174, 175, 176 and 177, are of latent phthisis, the predominant feature being often entirely unconnected with the affection of the lungs. The pathological indications in all cases of phthisis, however, excluding of course the variation due to degenerations of tissue, and inter-current diseases, may be briefly stated to be those of weak heart and atonic capillaries. These will be found especially prominent in cases complicated with hæmoptysis.

Aneurism, (see records, Part III.) The tracings of aneurism are usually what theory would lead us to expect, and the thrill perceptible to the touch at an advanced stage is simply anticipated at an earlier period by the Sphygmograph.

The tracings Nos. 178 to 180, inclusive, are presented in connection with each other under this head, simply to show the value of the instrument in diagnosis. The first tracing, 178, was taken from a man, age 50, with an immense aneurism of the subclavian artery, and although taken over the aneurism, which projected as

a swelling above the clavicle, it is a fair sample, magnified, of those from the radial artery. The patient was vigorous and free from other diseases, and, as in most or many cases of aneurism, was by no means convinced of the dangerous nature of his disease, nor assured by any unanimity on the part of the physicians who had seen him. Indeed there existed the widest difference of opinion as to the character and source of the swelling above the clavicle. A sudden death and autopsy, however, corroborated the evident testimony of the Sphygmograph.

This case may be compared with advantage with the two that follow it, Nos. 179 and 180. The first of these latter (179,) possesses considerable interest in this connection, chiefly because believed to be a case of subclavian aneurism up to the period of autopsy. No less distinguished a personage than Dr. Valentine Mott, 30 years ago, confidently decided that an aneurism; existed and although of late years only a dense swelling, with heaving and not distensile pulsation has existed, presenting itself just above the clavicle, yet no question seems to have arisen regarding the original diagnosis. The Sphygmographic tracings, however, failed to verify this, as may be seen (No. 179,) and at the autopsy the subclavian was found healthy, an exostosis on the first rib having given rise to the error by pushing upward the vessel in its growth.



Tracing No. 180, also a case mistaken for aneurism, was one of considerable interest, and may be briefly described. The patient, a man of about 50 years of age, presented himself for sympathy and pecuniary aid, and showed a certificate signed by several prominent physicians of a well known hospital in New York, to the effect that he had an enormous aneurism of the abdominal aorta. In spite of this appearance of authority, however, a very careful examination failed to furnish to my mind sufficient evidence of any such trouble, and while not able to substitute satisfactorily any other diagnosis, the Sphygmographic tracings taken from various arteries of the body strengthened the unbelief, and the man was dismissed as an impostor. This opinion was subsequently verified by his arrest by other parties and confession. The tracing, as may be seen, shows departure from health because of dissimilarity in the successive waves, but not suggestive of aneurism.



## PART III.

### CHAPTER I.

#### INVESTIGATIONS MADE WITH THE SPHYGMOGRAPH INTO THE ACTION OF CERTAIN MEDICINES UPON A HEALTHY PULSE.

It will be evident to any one, upon reflection, that with all remedies there may be an action upon the system at large, or upon the circulation, prior to its *sensible* and *familiar* action. If this be really the case, the Sphygmograph would discover it with a measurable degree of certainty. We may also reasonably look for certain other actions, too slight in degree to be perceptible to any perhaps but the patient, yet of such a nature as to afford valuable guides to the exhibition of the drugs. It is not improbable, moreover, that the action of certain poisonous remedies might be so perfectly recorded by the aid of the Sphygmograph as to afford a means of diagnosis in cases of poisoning, or be the measure of the chances of the patient. It is at any rate certain, that by it we may determine the first moment at which the system feels the effect of the substance administered, whether it primarily affect the circulatory or the nervous system, or both, and ascertain by the determination of

predominance of pressure in arteries or veins, the possible effect of a remedy upon a condition of stasis in either.

The physiological and pathological indications in this direction are important and interesting, and the tracings, which have been taken with great care, are given in detail.

Four drugs have been selected for the experiments, of known purity and freshness, and in each instance with the exception to be noted, the first tracing was taken and the first dose of the drug also at 9 P. M., always at least  $2\frac{1}{2}$  or 3 hours after the last meal of the day. The observations were made upon my own pulse, and as a comment upon the facility with which the instrument can be used, the tracings, in every instance, were made by myself.

The experiments with the first drug, Cannabis Indica, are given with minuteness of detail, as illustrative of the manner of making the observations, but the subsequent ones will be treated more briefly.

## FIRST EXPERIMENT WITH CANNABIS INDICA.—ALCOHOLIC EXTRACT.

## SPHYGMOGRAPHIC OBSERVATIONS.

## PHYSIOLOGICAL EFFECTS.

OCTOBER 31st, 1872.

9.15 P. M. First Tracing normal, smooth, and even (not recorded), 5 grains taken. . . . .	9.15. Feeling vigorous and well.
9.35 P.M. (Tracing 181.) Two records, at 0° and 2½°. Diminished frequency. . . . .	9.35. A feeling of lightness perceptible.
10 P. M. (Tracing 182.) Two records at 4½°. Oscillation singularly marked; tension increased; amplitude and frequency diminished.	10 P. M. Nervous and excited.
10.05 P. M. (Tracing 183.) Two records showing a sudden return of, or rather approaching, a normal condition.	10.05. Sudden freedom from any unusual feeling.
10.15 P. M., 7 grains more. . . . .	

FIRST EXPERIMENT WITH CANNABIS INDICA.—Continued.

SPHYGMOGRAPHIC OBSERVATIONS.

PHYSIOLOGICAL EFFECTS.

10.40 P. M. (Tracing 184.) Record at 2½° shows capillary resistance and wave of recoil.

11.45 P. M. (Tracing 185.) Two records at 2½° and 0°, gave similar results, indicating venous impletion. Frequency increased. . . . .

11.50 P. M. (Tracing 186.) Record at 2½° .

11.55 P. M. (Tracing 187.) Record at 2½°, both the latter exhibit impaired propulsive power of the heart. . . . .

10.40. Excited.

11.50. Drowsy and calm.

Total amount 12 grains within 2 hours.

SECOND EXPERIMENT WITH CANNABIS INDICA.—TINCTURE.

INSTRUMENTAL OBSERVATIONS.

NOVEMBER 2d, 1872.

9.15 P. M. Thirty drops.

9.20, 9.25 and 9.45 P. M. (Tracing 188.) Records all taken at same pressure. At the latter hour the amplitude began to show increase of tension. . . . .

9.45 P. M. Forty drops more. . . . .

Tracings at 9.50, 10.00 (Tracing 189) and 10.15 P. M. (Tracing 190) exhibit only increase of tension with, at the latter hour, diminished frequency equal to ten beats. . . . .

PHYSIOLOGICAL OBSERVATIONS.

9.45 Beginning to feel an indefinable sensation of comfort.

10 P. M. Slightly exhilarated.

10.15. Somewhat drowsy.

SECOND EXPERIMENT WITH CANNABIS INDICA.— <i>Continued.</i>	
INSTRUMENTAL OBSERVATIONS.	PHYSIOLOGICAL OBSERVATIONS.
10.20 and 10.25 P. M. (Tracing 191.) Tension and frequency variable.	
10.25 P. M. Forty drops more.	10.25. All effects apparently gone.
10.45 P. M. (Tracing 192.) Records exhibit great increase of arterial tension . . . . .	10.45. Again exhilarated.
11 P. M. (Tracing 193.) Frequency greatly increased, equal to 30 beats and falling in five minutes as many; tension less. . . . .	11 P. M. Drowsy, but not pleasantly so, nor as if from desire to sleep.
11.05 P. M. (Tracing 194.) Record shows increased cardiac excitement at beginning of systole, with some obstruction, either proximate or distal. . . . .	Total amount 110 drops.

THIRD EXPERIMENT WITH CANNABIS INDICA.—TINCTURE IN LARGE DOSES.

INSTRUMENTAL OBSERVATIONS.

November 5th, 1872.

9 P. M. 100 drops. Tracing normal. . . . .

9.10 P. M. (Tracing 195.) Amplitude and therefore tension increased, frequency steadily diminishing till 9.45. Tracings at 9.30, 9.45. . . . .

10 P. M. 120 drops more. . . . .

10.10 P. M. (Tracing 196.) Diminished tension and the oscillation of cerebro-spinal implication. This tracing by accident in transfer, fails to show this except in the first wave. . . . .

10.15 P. M. Same. . . . .

PHYSIOLOGICAL OBSERVATIONS.

9 P. M. Feeling well.

10 P. M. No effect experienced.

## THIRD EXPERIMENT WITH CANNABIS INDICA.—Continued.

INSTRUMENTAL OBSERVATIONS.	PHYSIOLOGICAL OBSERVATIONS.
10.35 P. M. (Tracing 197.) Obstruction either proximate or remote. . . . .	
10.40 P. M. (Similar to tracing 195.) Diminishing obstruction. . . . .	
10.45 P. M. 200 drops more. . . . .	10.45. Very little effect.
11.15 P. M. (Tracing 198.) Diminished tension and evident sedation, but frequency slightly increased. . . . .	
11.18 P. M. Same. . . . .	11.18. No effect whatever.
	Total amount taken 420 drops!



FINAL EXPERIMENT WITH CANNABIS INDICA.—FRESH ALCOHOLIC EXTRACT.

INSTRUMENTAL OBSERVATIONS.	PHYSIOLOGICAL OBSERVATIONS.
November 9th, 1872.	
9.50 P. M. Twelve grains of fresh extract taken.	9.50 P. M. Feeling not well as usual owing to overwork; otherwise all right.
10 and 10.15 P. M. Tracings showed diminishing frequency and tension, and not feeling well a pressure of 0° was found to be the best for observation, instead of 2½° as heretofore. . . . .	10.15. A little nauseated, and eyes heavy.
10.30 P. M. (Tracing 199.) Frequency still less, pulse small but normal, showing sedation. . . . .	10.30. Feeling comfortable and well.

FINAL EXPERIMENT WITH CANNABIS INDICA.— <i>Continued.</i>	
INSTRUMENTAL OBSERVATIONS.	PHYSIOLOGICAL OBSERVATIONS.
10.45 P. M. Pulse somewhat excited. Fourteen grains more taken. . . . .	10.45. Effect passing off.
11.25 and 11.40 P. M. (Tracings 200 and 201.) Records exhibited great weakness of cardiac power, it being difficult to obtain them even at 0°. . . . .	11.25. A few minutes exhilarated, then very drowsy, but no impairment of will.
11.45, 11.48 and 11.50 P. M. (Tracing 202.) The records taken showed a sudden decrease of frequency and tension and equally sudden increase. . . . .	11.45. Drowsiness gone, and feel free from any effect. 12.30 M. Terrific excitement, twitchings, dreams, &c., sensations as of swelling of the head, painful insomnia and feeling of desperate recklessness.

November 10th. (Tracings taken the day following the use of the drug.)

7.50 A. M. Tracings small and showing weak heart. . . . .

12.30 M. (Tracing 203.) Same, but showing also the slight dirotism of capillary dilatation.

7.50 A. M. Peculiar action of medicine still evident, head swollen, confusion of ideas, &c.

12.30. Have been asleep and feel better; influence passing off.

Total amount taken 26 grains! Time, 2 hours and 40 minutes.

## SYNOPSIS OF EFFECTS OF THE REMEDY.

DOSE AND TIME—FIRST EXPERIMENT.	FIRST PERCEPTIBLE EFFECT IN TRACING, AND ITS CHARACTER.	MAXIMUM EFFECT.
5 grains, 9.15. . .	<p>After 20 minutes, diminished frequency. . . .</p> <p>After 45 minutes, marked cerebral disturbance, exhibited in oscillation and minimum amplitude and frequency, with increased tension.</p> <p>In 50 minutes, sudden cessation of effect.</p>	<p><i>Maximum effect of first dose in 45 minutes.</i></p>
7 grains, 10.15. . .	<p>In 35 minutes, capillary disturbance and increased tension with increased frequency. . . .</p> <p>In 40 minutes, beginning of impairment of cardiac impulse, continuing two hours from administration of remedy.</p>	<p><i>Of second dose in 30 minutes.</i></p>

SECOND EXPERIMENT.	30 drops of Th., 9.15 P. M. . . .	In 30 minutes increased tension. . . . .	<i>Of tension in 35 minutes.</i>
40 drops more— 9.45. . . . .	In 60 minutes from first dose, diminished frequency—arterial tension great. . . . . In 1 hour and 10 minutes irregularity in tension and frequency, with increase in prominence of waves, showing cerebro-spinal stimulation. .	<i>Of irritation in 35 minutes.</i>	
40 drops more— 10.25. . . . .	In 1 hour and 45 minutes great increase of frequency, equal to 30 beats; falling as many in five minutes more, with reduced tension. . In 1 hour and 50 minutes from first dose evidences of increased irritability of the heart, with some obstruction, either proximate or remote. .	<i>Of frequency in 1 hour 45 minutes.</i>	<i>Of diminished power 1 hour 5 minutes.</i>
			<i>Of some obstruction to circulation 1 hour 45 minutes.</i>

SYNOPSIS OF EFFECTS.—*Continued.*

DOSE AND TIME—FIRST EXPERIMENT.	FIRST PHYSIOLOGICAL EFFECT OF THE DRUG, AND ITS CHARACTER.	MAXIMUM EFFECT.
5 grs. 9.15. . .	In 20 minutes, lightness. . . . . In 45 minutes, nervousness and excitement. In 50 minutes, sudden freedom from any effect. In 25 minutes, excitement. . . . .	From first dose, maximum of excitement in 45 m.  From second, maximum of excitement in 25 min.
7 grs. 10.15. . .	In 95 minutes, drowsiness and calm. . . . .	Maximum of sedative effect in 12 minutes.
SECOND EXPERIMENT. 30 drops of Tr., 9.15 P. M. . . .	In 30 minutes, quiet. . . . .	Of exhilaration in this experiment 45 min. from 1st dose.

	In 45 minutes, exhilaration. . . . .	Maximum of drowsiness, in 1 hour.
	In 1 hour, drowsiness.	
40 drops more—	In 20 minutes after <i>second</i> dose, new excitement . . . . .	Of exhilaration after second dose, in 20 minutes.
9.45. . . . .		
40 drops again at	In 35 minutes, drowsiness. . . . .	Of drowsiness, in 35 minutes.
10.25. . . . .		

Synopsis of the two later experiments with Cannabis Indica need not be given. It may be briefly said of them, that the doses were large and repeated at nearly one hour intervals. The effect was in the first of these apparent in the tracing in ten minutes, and a steady diminution of frequency resulted, until in 45 minutes there occurred evidence of implication of the nervous system. In 35 minutes after the second dose there appeared evidence of some obstruction to circulation, either near the heart or in the capillaries, and after 420 drops had been taken the arterial tension was greatly reduced, with corresponding increase of the venous pressure, and marked sedation just two hours and fifteen minutes from the first dose, and thirty from the last and largest.

Finally sudden cessation of effect.

In the last experiment detailed, in which a fresh alcoholic extract was again used, the following facts were noticed :

1st.—Tracings abnormal from malaise at the beginning became normal in forty minutes, with marked sedation and diminished frequency. In fifty-five minutes began the stage of exhilaration, at which time a larger dose was taken. After fifty-five minutes the heart's impulsive power was evidently weakened, and shortly after began a vacillation both of equilibrium of pressure and frequency.



In one hour and forty-five minutes the nervous system was broken down by the excitement of reaction, a state lasting for twelve hours.

## CHAPTER II.

### EXPERIMENTS WITH GELSEMINUM.

It would be tedious and unnecessary to give the minute details of the experiments made with the remaining remedies.

In brief, these were *Gelseminum Sempervirens*, *Aconitum Napellus*, and *Quiniæ Sulphas*.

The first, the tracings illustrative of which are given (Nos. 204 to 209 inclusive), were with reference to the action of *Gelseminum Sempervirens* :

At 9.00 P. M. Six drops of Tilden's fluid extract were taken.

At 9.30 P. M. Being slightly drowsy, six drops more.

At 10.00 P. M. Ten drops more, with the following result:—10.15. A heavy feeling in the ears, and sense of weight over the forehead.

10.20 P. M. A peculiar sense of constriction at the base of the tongue.

10.40 P. M. Drowsiness increasing.

10.55 P. M. Peculiar slowness of respiration—7 to the minute.

11.05 P. M. Disappearance of all effects.

11.25 P. M. Sense of giddiness.

11.35 P. M. Free from all sensible effects.

This drug has been selected for experiment for the two-fold reason that difference of opinion as to its action has existed among medical men, and that a somewhat large personal experience with it enables me to speak of it with some familiarity. This experience has been favorable in puerperal eclampsia and the convulsive disorders of children, the neuralgic and congestive affections of the uterus or ovaries, and particularly in cardiac and pulmonary diseases, where sedation and reduction in frequency of pulse have been desired. With reference to its action in the latter respect, the tracings will be found instructive; and in view of the unfavorable opinion expressed by Da Costa (*Am. Jour. Med. Sc.* 1871) as to its action in irritable heart, they will probably be also interesting. In his hands, reduction of impulse and frequency were so slight as to be unimportant.

The tracings given may be compared profitably with those of Aconite, which succeed.

It is a fact worthy of notice, although already referred to, that in this case, as in many others, the Sphygmograph shows the action of the remedy often long prior to the exhibition of any sensible or physiological effect.

This, in the present instance, is made the more noticeable by the fact that at the beginning of the experiment the pulse was not perfectly normal, owing to fatigue, excitement, and loss of rest.

With regard to the dose used, a word is necessary. Having frequently observed the toxic action of the drug, even to ptosis, roaring in the ears, &c., after giving three drops of the fluid extract at intervals of half an hour, this fact of personal experience has been in mind throughout the experiment;—as with *Cannabis Indica* I was myself the subject in the case.

On the 12th of November, at 9 P. M., six drops were taken; at 9.30, six drops more; and at 10 o'clock, ten drops. The results, which were as follows, are also indicated on the chart.

Not being perfectly well, there existed either a recoil or dicrotic wave in the preliminary tracing, which in 30 minutes seemed rather to become more prominent, and but for the records that follow, might be at once set down as a true dicrotous wave. As at this time there will also be seen diminution of compressibility, as shown by diminished amplitude under the same pressure, the prominence of the waves, whatever its explanation, must be ascribed to a morbid condition, viz: that produced by the influence of the poison administered. The pulse at this interval has reached a minimum as to frequency, and in ten

minutes more shows slight impairment of rhythm. The new dose of ten drops exhibits its first influence in the tracing in 30 minutes, by increased arterial tension and nervous stimulation, followed however in five minutes by diminution of both, and great decrease in frequency. From this time on to the end of an hour, the tension in the arterial system slowly increased, although the frequency remained nearly the same, and after one hour and a half the appearance of some obstruction as shown in the flattening of the conjoined apices of the first and second events was manifest, and irregularity of impulse and of rhythm exhibited the effect of the poison upon the heart.

*Neither of the effects last named could have been perceived by any other means than the Sphygmograph; and at this time the sensible action of the medicine had disappeared.*

The simple deduction from this investigation, apart from what is already known of the remedy, lies in this—that while reducing the frequency of the pulse, it does so with an *increase of arterial tension*, and after a while impairment of the heart's action, indicating a toxic influence upon the nervous system.

It is therefore not surprising that singularly incompatible experiences have been recorded by different physicians.

## CHAPTER III.

### EXPERIMENTS WITH ACONITE.

The third experiment\* was made November 14, 1872, with a fluid extract of Aconite root, upon a young lady perfectly well, as far as could be ascertained, and aged eighteen years.

A pressure of 2° was found the most available, and was, as in all these later investigations, maintained throughout: tension being ascertained by amplitude, as already described in the preceding pages. The oscillation evident in the first tracing was simply the result of nervous tremor.

This young lady took four drops in all, 1 at 1.50 P. M., one at 2.20, and two at 2.45. In twenty-five minutes from the first dose occurred the first effect in the tracing; reduction of frequency and force, there being no physiological influence perceptible. *In five minutes* more occurred a sudden increase of both, without apparent cause, although from the fact that the tracing shows slowness of collapse of the artery, it may have

---

\* Tracings 209 to 213 inclusive.

arisen from capillary constriction due to the direct stimulus of the impelled current against them. In five minutes more this has disappeared, and in forty from the administration of the first dose, the force, frequency and arterial tension have reached a minimum without any perceptible physiological effect being experienced.

The new dose shows itself in twenty minutes instead of twenty-five, as with the first, and two drops additional were taken.

In thirty minutes thereafter, the pulse-writing being almost a straight line, and having thus exhibited the maximum effect of the remedy in a minimum of tension, force, frequency and complete disappearance of all evidences of nervous or other excitement, *the first appearance of any sensible effect occurred* in a simple dizziness upon exertion.

*Aconite continued—larger doses.*

The next experiment was made November 14, 1872, upon myself, with a fresh fluid extract of Aconite root, and its effects were briefly as follows (tracings 214 to 221 inclusive):

The first effect visible in the tracing occurred in fourteen minutes, viz., diminished frequency; and in three minutes more, or seventeen from the taking of

the remedy, a great increase of arterial tension, with prominence of the wave of recoil.

After thirty minutes this was slightly less, and the first physiological or sensible effect occurred in a sensation of fullness of the carotids.

The maximum of nervous excitement and increased tension is visible at 9.45, or 35 minutes after the dose, followed by reaction and minimum of frequency, and tension at 10.

With the next dose the *maximum*, showing the stage of excitement due to the remedy, occurs in thirty minutes. The reaction, or *minimum* of force, frequency and tension, and showing sedative influence, occurs ten minutes later. In fifty minutes a feeling of faintness occurred, not however indicated in the tracing, and therefore, probably, a reflex phenomenon due to the condition of the stomach.

In one hour and twenty minutes, when the true physiological effects of the remedy were shown, as stated on the chart, a great increase of frequency and arterial tension with cerebral excitement were manifest, followed however by reaction and variations in the pulse-wave, until at twelve o'clock the long even wave of health is given, even under a pressure of 5°, and all sensible effects had passed away.

The deduction from these experiments is of special interest, and we may compare it with a degree of cer-



tainty eminently satisfactory with that of Gelseminum.

Leaving out all other considerations, we have this one fact apparent, that Aconite unlike Gelseminum, while primarily showing a stage of excitement, yet reduces the heart's action as to frequency of beat *without increasing arterial tension.*

The application of this fact to pathology will be evident.

## CHAPTER IV.

### EXPERIMENTS WITH QUININE.

Two experiments with this drug are presented, showing the effects of single large doses, and of frequently-repeated smaller ones. The deductions, in brief, are as follows :

First. November 16th (tracings 222 to 225 inclusive). Being especially sensitive to the tonic action of quinine, and moreover very susceptible to the influence of substances having a bitter taste, when taken simply into the mouth, the first dose taken was but half a grain, dry, upon the tongue. Its action when thus administered cannot be mistaken as affecting the circulation ; a lessened frequency, increased tension, and developed vibratile character, were apparent in fifteen minutes, no sensible effects of course being manifest.

At this time, the pulse being 64 per minute, ten grains were taken.

The above-named features (tracing 226) were magnified, and reached a maximum in twenty-five minutes after the large dose, and in thirty minutes occurred the

minimum of tension, with, however, increased frequency, and after that a variation of both within a very brief interval.

The only inference from this experiment, relates to the stimulant and sedative properties of quinine upon the nervous and circulatory system.

*Quinine continued—small and repeated doses.*

November 18, 1872 (tracings 227 to 233 inclusive).

On this occasion two grains of the sulphate were taken every ten minutes up to sixteen grains, with the effects perceived in the tracings, beginning at 10 o'clock P. M. On this evening, as shown by the preliminary tracing, there existed the fatigue and slight excitement due to the arduous work of the day just closed.

At 10 P. M., first dose of two grains.

In seven minutes occurred diminished frequency. In twenty-three this had reached a maximum, the tension being slightly increased, as shown by the transmission of the alternate waves.

A sedative influence, both nervous and circulatory, became apparent at 11.30, and existed until 12 o'clock, when the influence upon the nervous system is shown by the peculiar shape of the primary wave and the delayed collapse of the artery (231).

From this hour, when a feeling of tension in the back

of the head was noticed, the excitement of the nervous system increased, and is thus described in my notes made the following day :

“Unsound and troubled sleep ; nervous jactitation and twitching ; stuffed sensation in the head, and frequent desire to micturate, with painful vesical spasm after each attempt—and heavy deposit of phosphates ; pain in the bowels ; and severe neuralgic or congestive pain under the left nipple, lasting all night.

“Awoke with all the sensations common to a man after a night of dissipation and excess. Feeling of twitching all over the body, with no apparent or actual trembling ; dull heaviness in the ears and back of the head, with pulse of 96.”

At 8.30 P. M. tracings were taken (232) which exhibited all the feelings above described as graphically as they were experienced.

The oscillation here evident furnishes an interesting comment to the rules relative to this feature, given on page 73.

The deductions from this experiment, aside from what is already familiar, in conjunction with the action of quinine, relate chiefly to the influence upon the frequency of the pulse and the state of the nervous system, the effect of large and small doses, and the moment at which their action begins.

Reference need not be made in this connection to the

experiments with ordinary means of observation by others—detailed in the many periodicals of the day—as it is presumed that its singularly diversified actions under different circumstances are familiar, but the facility with which observation may be stamped as accurate or otherwise by the Sphygmographic record, is suggested by the examples here given.

## CHAPTER V.

### REMARKS IN CONCLUSION.

To attempt in any perfect manner to epitomize the indications afforded by the Sphygmograph in the numerous examples presented, would prove a serious task, especially as deeper meaning probably lies in the tracings than has yet been revealed ; but if the reader will bestow the requisite amount of patience upon their study the appearance of similarity will vanish, and assurance that both the pathological and physiological indications afforded by the instrument are of great importance, will seem well founded.

What we have endeavored to show, by the somewhat diffuse exposition of the subject, may, however, be thus briefly summed up.

First. That the new principle in the construction of the instrument exhibits a new and wider field as within its scope.

Second. The value of a knowledge of the minute peculiarities of the arterial current, in connection with the determination of the condition of both the vascular and nervous system.

(Under this head have been considered the condition of the heart as to vigor or irritability, character of impulse, duration of systole, hypertrophy eccentric or concentric, condition of the valves, etc. ; the relative tension in arteries or veins ; the condition of the former as to contractility, passive dilatation, degeneration, etc. ; and also the physiological inferences educed under the action of medicines.)

Third. *The power of the Sphygmograph to develop this knowledge, and correctly record it.*

(Under this have been considered the significance of each part of a tracing, so far as heretofore described, and also *new* features drawn from personal experience, substantiated by examples.

Studies of tracings and numerous cases have been presented, that the student desirous of forming his own conclusions may do so.)





# INDEX.

---

	PAGE
Aconite, . . . . .	154
Action of Medicines, . . . . .	45, 71, 133, 150
Acute Enteritis, . . . . .	122
Amputation, Influence of, . . . . .	56, 70, 98
Aneurism, . . . . .	48, 56, 70
Anger, Influence of, . . . . .	93
Aortic Pulsation, . . . . .	97
Arterial Tension, . . . . .	79
Arterial Waves, . . . . .	38
Artery, Artificial Obstruction of, . . . . .	84
Arthritis, Rheumatic, . . . . .	123
Artificial Heart, . . . . .	59
Asthma, with Bronchitis, . . . . .	115, 116, 117
with Disease of Heart or Kidneys, . . . . .	116
with Emphysema, . . . . .	115
without Complication, . . . . .	115, 116, 117
 Bronchitis. See "Asthma with."	
Bright's Disease, . . . . .	124
 Cancer, . . . . .	122
Cannabis Indica, . . . . .	135
Cardiac Wave, . . . . .	39
Cardiac Disease. See "Heart."	
Carotid Tracings, . . . . .	75
Cautions, . . . . .	90

	PAGE
Chinese Views of the Pulse, . . . . .	33
Chronic Ovaritis, . . . . .	94, 123
Compressibility, . . . . .	64, 79, 84, 85
Congestive Chill, . . . . .	121
Corrigan, Dr., . . . . .	65
Da Costa's Diagnosis by the Pulse, . . . . .	36
Debility, . . . . .	99
Degree of Pressure required, . . . . .	27, 28
Delirium Tremens, . . . . .	58
Deranged Sympathetic, . . . . .	97
Description of Instruments, . . . . .	18
Dial, . . . . .	26
Diarrhœa, . . . . .	
Diagnosis, Cases for, . . . . .	121
Diastolic Wave, . . . . .	54
Dicrotism Explained, . . . . .	58
Disease of Sympathetic System, . . . . .	97
Lungs, . . . . .	128
the Heart, . . . . .	48, 49, 55, 58, 101, 126, 127
Spinal Cord, . . . . .	117
Dissipation, . . . . .	114
Duration of Impulse, . . . . .	34
Effect of Artificial Obstruction of Circulation. . . . .	84
Emotion, Effect of, . . . . .	93
Emphysema. See "Asthma with."	
Enlargement of the Heart, . . . . .	104 <i>et seq.</i>
Enteritis, . . . . .	122
Epilepsy, Case and Tracing, . . . . .	46, 122, and Chart opp. p. 44
Exciting News, Effects of, . . . . .	93
Experiments with Medicines, . . . . .	133

	PAGE
Faintness, . . . . .	92
Fatigue. See first Tracing in Final Experiment with Cannabis Indica.	
Fourth Event, . . . . .	54
Frequency of Pulse, . . . . .	35
Full Meal, . . . . .	93
Functional Derangement of Nervous System, . . . . .	92, 93
Functional Disease of the Heart. See Chap. on Dis. of the Heart,	101
Gangrena Senilis, . . . . .	125
Gelseminum, Effects of, . . . . .	150
Hæmoptysis, Recent and Remote, . . . . .	94, 95, 128
Health, Variations Compatible with, . . . . .	91
Heart. See "Disease of the Heart."	
Hemorrhage after Confinement, . . . . .	46, 70, 124
Hysteria, . . . . .	46, 96, 99
Kidneys, Disease of, . . . . .	124
Laryngeal Phthisis, . . . . .	126, 127
Lifting Power of the Arteries, . . . . .	23
Locomotion of Arteries, . . . . .	64
Locomotor Ataxy, . . . . .	117
Longevity, . . . . .	86
Loss of Limbs, . . . . .	56, 70, 93
Lungs, Disease of, . . . . .	128
Mania-a-Potu, . . . . .	113
Manufacturer of the New Sphygmograph, . . . . .	28
Marey, Professor, . . . . .	17, 54
Medicines. See "Action of,"	

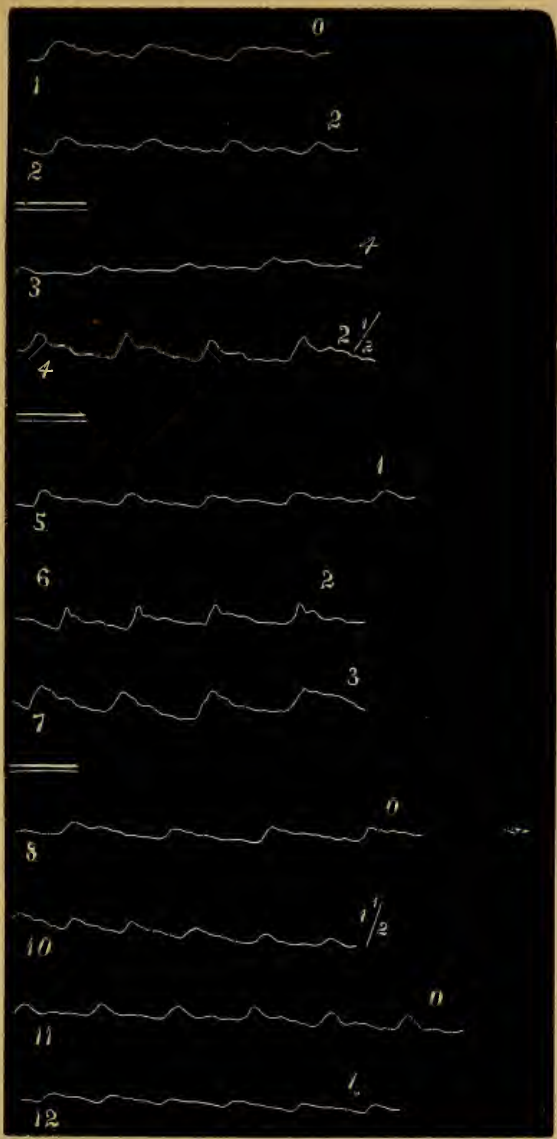
	PAGE
Metrorrhagia, . . . . .	46, 70, 124
Minor Disturbances of the Pulse, . . . . .	93
Nervous Element in a Tracing, . . . . .	113
Nervous System, Affections of, . . . . .	113
Oscillation, . . . . .	64, 65, 72
Over-work, . . . . .	91
Over-exertion, . . . . .	93
Ovaritis, . . . . .	94, 123
Pen Described, . . . . .	25
Pericarditis. See "Disease of the Heart."	
Phthisis, . . . . .	47, 57, 58, 126, 128
Pressure, Element of, . . . . .	26, 64
Prognosis, . . . . .	86
Progresso-loco-moto-ataxia, . . . . .	117
Pulmonary Diseases, . . . . .	128
Pulse, Characteristic Tracings of, . . . . .	86
Pulse, Indications afforded by, . . . . .	30
Quinine, Action of, . . . . .	158
Recoil, Wave of, . . . . .	64, 75
Regurgitation. See "Disease of the Heart."	
Rheumatism, . . . . .	126, 127
Rhythm, . . . . .	35
Sanderson, Professor, . . . . .	21, 35
Second Event, Significance of, . . . . .	50
Senile Gangrene, . . . . .	125

INDEX.

169

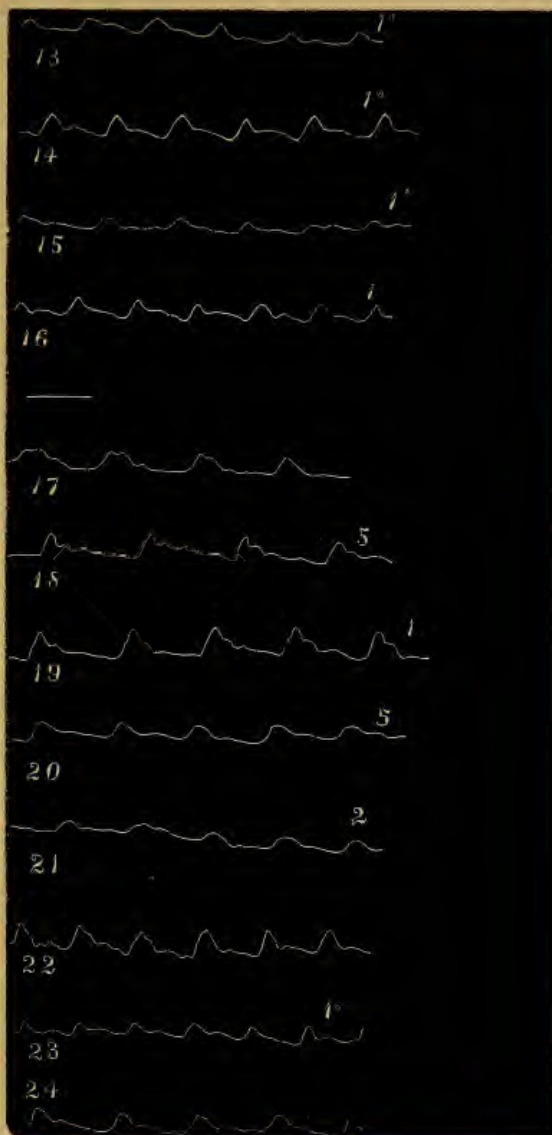
	PAGE
Singular Cases, . . . . .	121
Stomach, Empty or Full, . . . . .	93
Sunstroke, . . . . .	114
Tension of Arteries and Veins, . . . . .	35
Third Event, . . . . .	51, 53
Tobacco, Influence of, . . . . .	57, 71, 95, 96, 100
Translation of Tracings, . . . . .	38
Value of Means of Registering Pressure, . . . . .	80
Valvular Disease. See "Disease of the Heart."	
Variations Compatible with Health, . . . . .	91
Vertigo, . . . . .	55, 103, 110, 113
Vibration, . . . . .	65
Vierordt, . . . . .	17
Volume of Pulse, . . . . .	34
Waves, Successive, explained, . . . . .	39
Whittingham, Dr., of New Jersey, Singular Case by, . . . . .	69



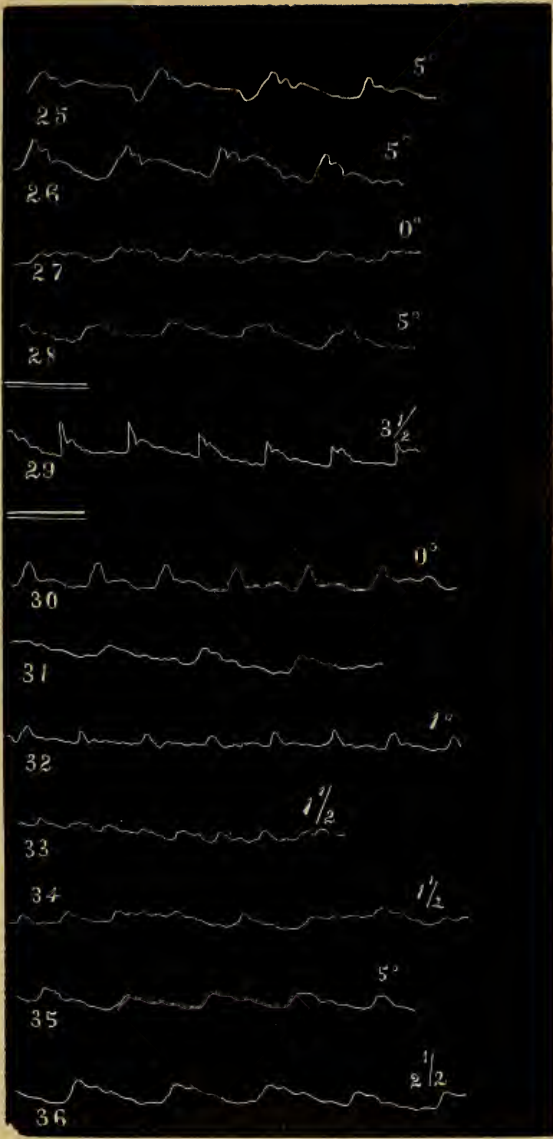




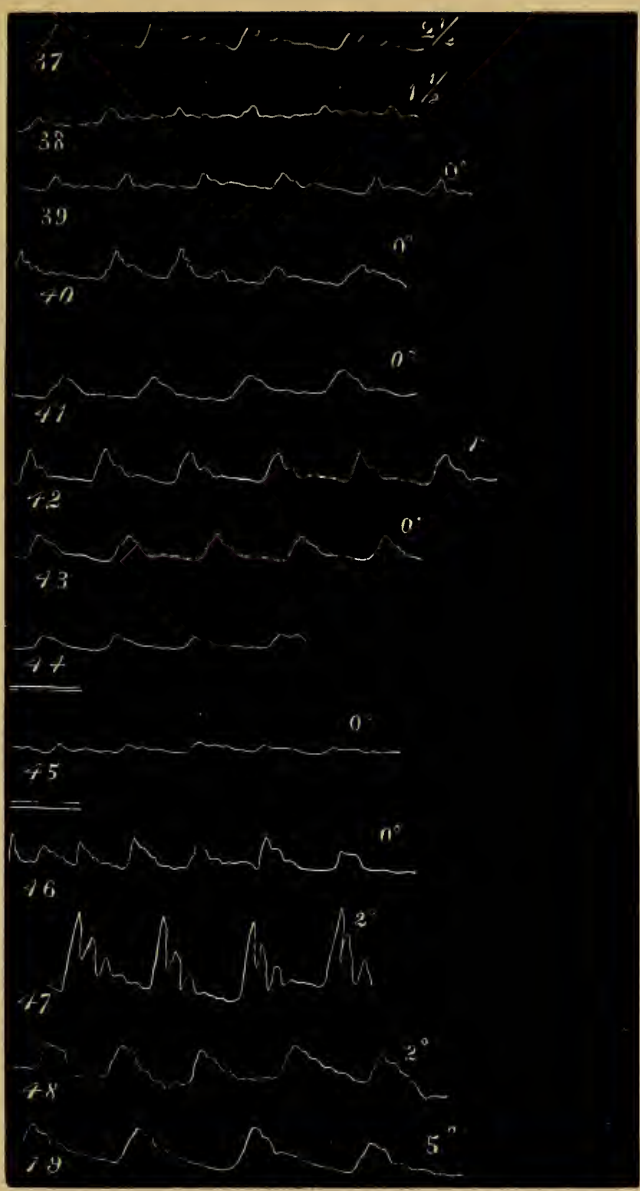














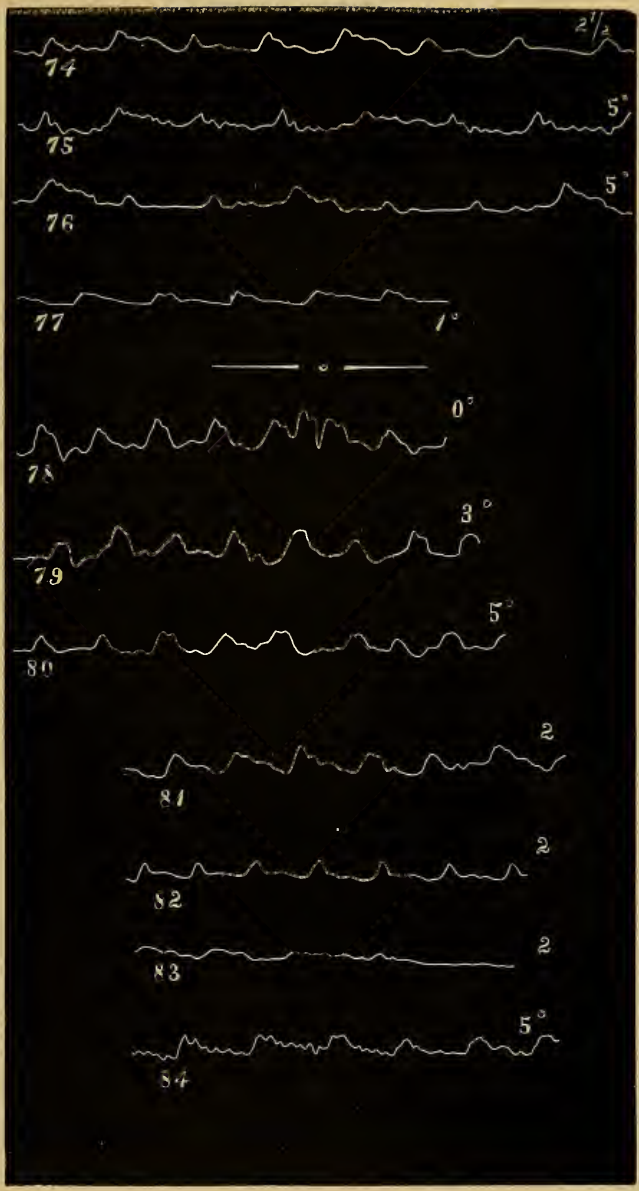




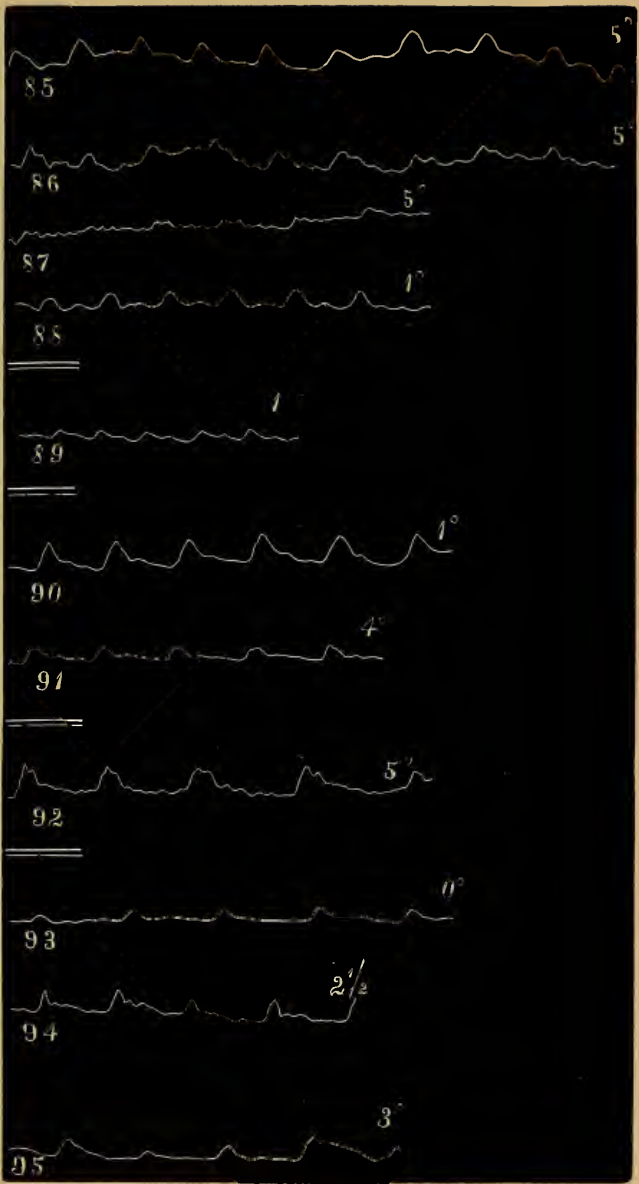




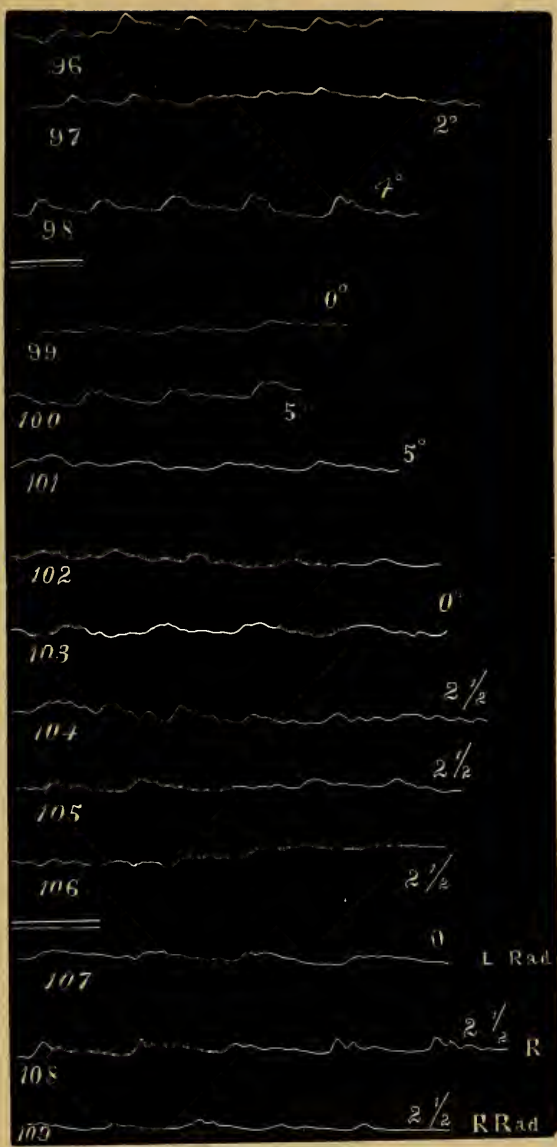










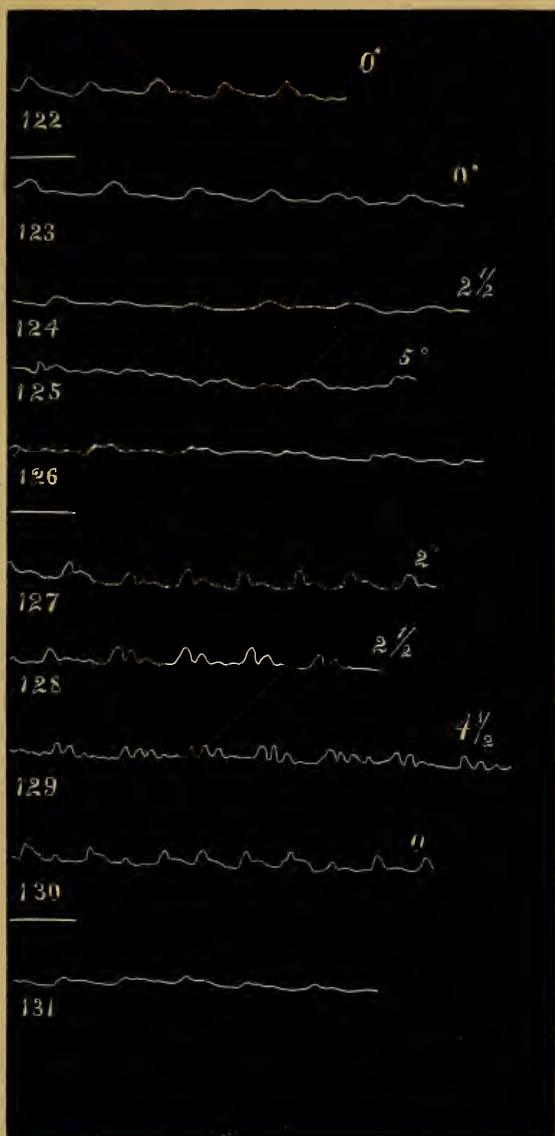




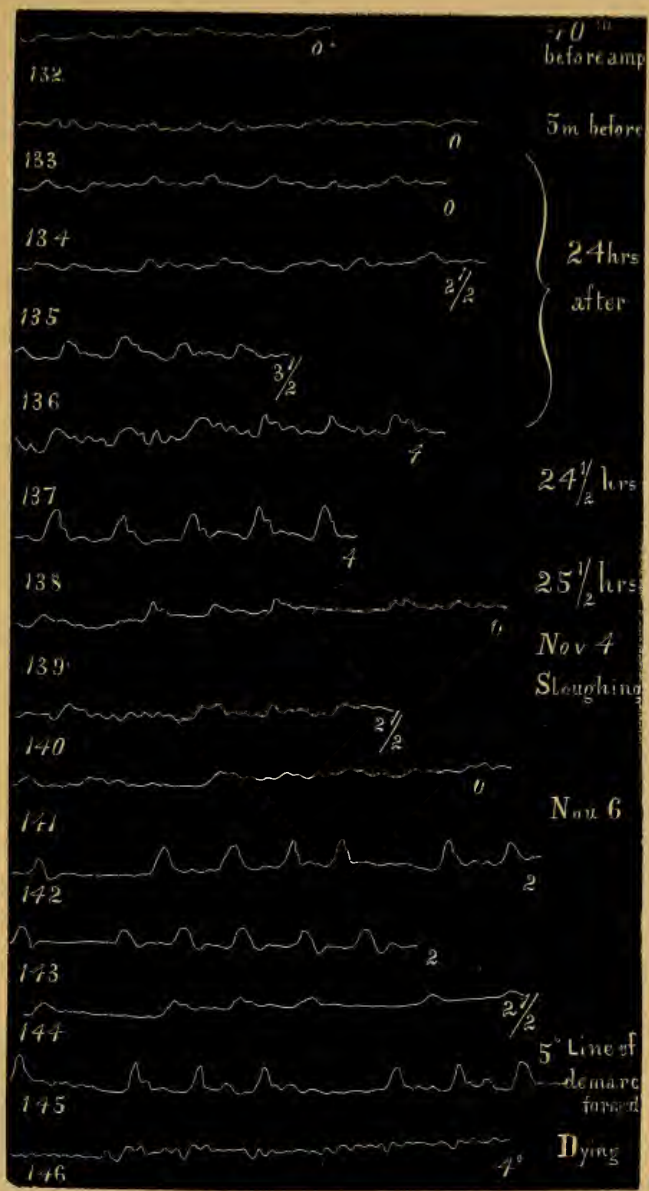










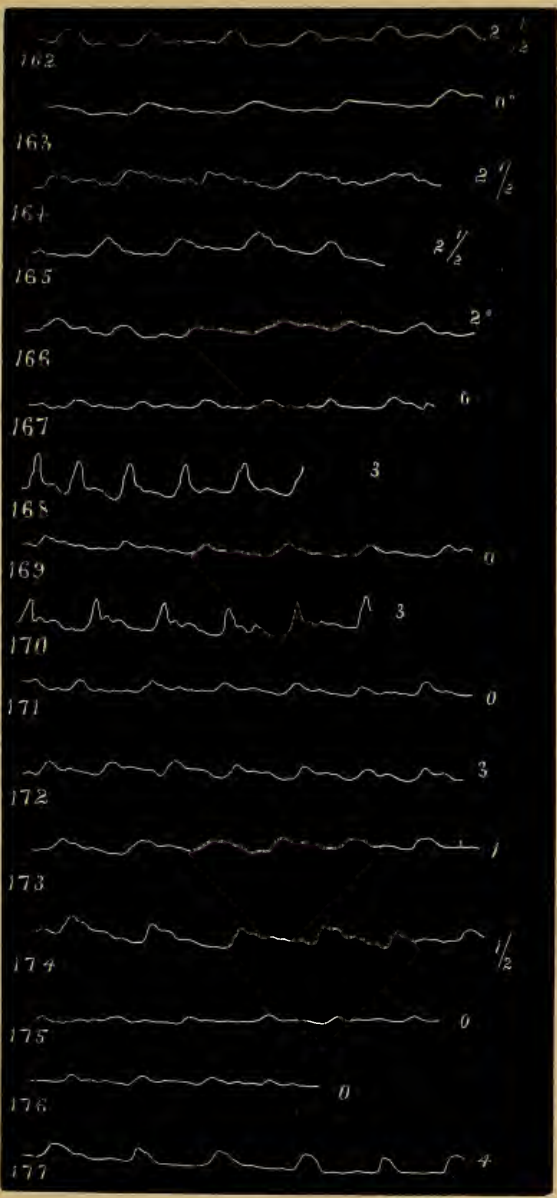




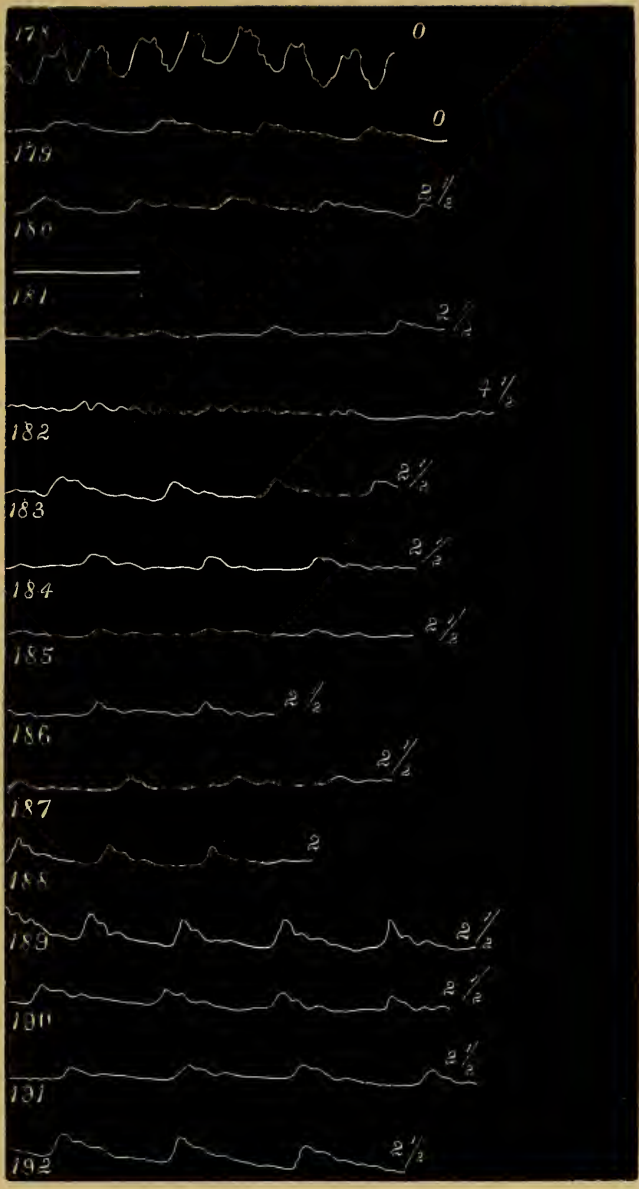




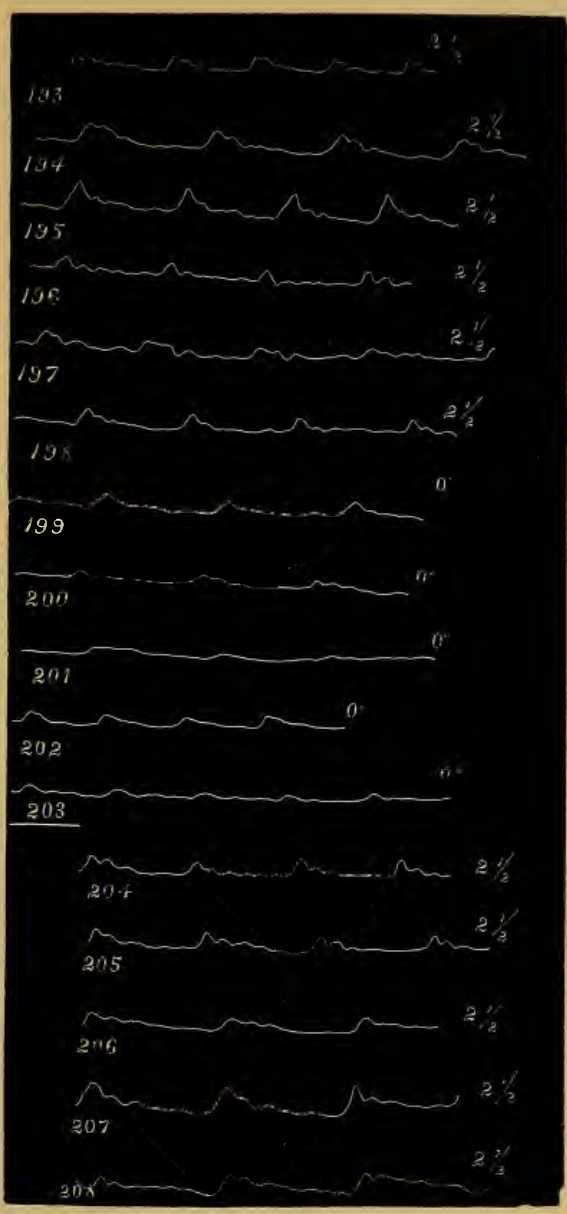




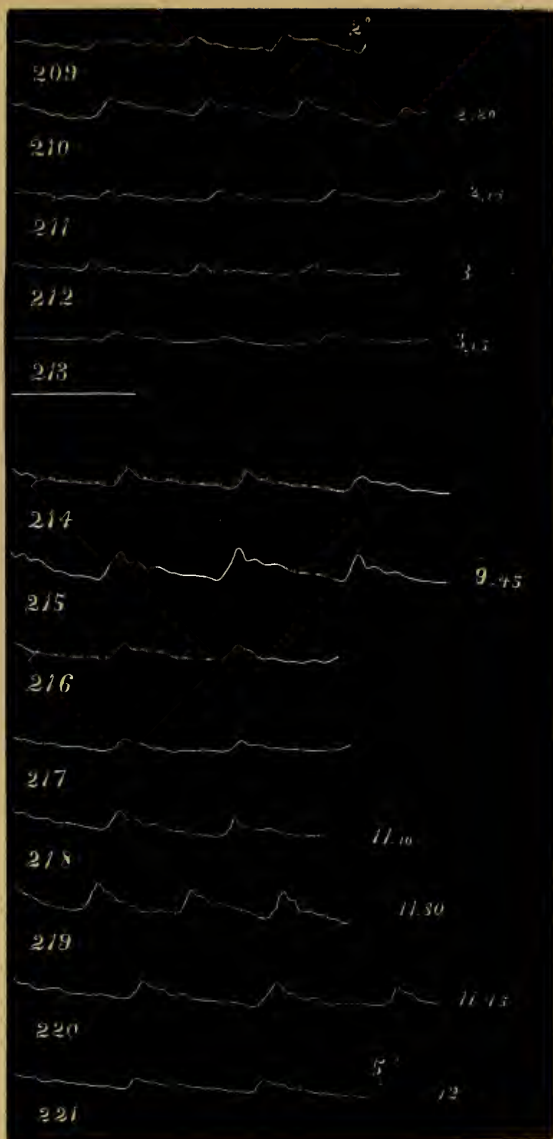
















222

223

224

225

226

---

227

228

229

230

231

---

232

233



# CLASSIFIED INDEX

(BY SUBJECTS)

OF

## PRESLEY BLAKISTON'S PUBLICATIONS

NO. 1012 WALNUT STREET, PHILADELPHIA.

Full Descriptions of these books will be found in the annexed Alphabetical Catalogue.

- ACTION OF MEDICINES.**  
 Brunton, The Action of Medicines. Pt. 1. Circulation. *[In Press.]*  
 Headland, on the Action of Medicines. 6th Ed. \$3.00  
 Ott, The Action of Medicines. 22 Illustrations. \$2.00  
 Rutherford, Physiological Action of Drugs on the Secretion of Bile. 100 Illustrations. \$3.00
- ANATOMY.**  
*(See also Osteology, and Atlases.)*  
 Bradly, Comparative Anatomy and Physiology. 60 Illustrations. Third Edition. \$2.00  
 Braune, Topographical Anatomy. Photo-lithographic plates. 4to. Cloth, \$10.00; half morocco, \$12.00  
 Heath, Practical Anatomy. Fifth London Edition. Nearly 300 Illustrations. \$5.00  
 Holden, Anatomy and Dissections of the Human Body. Fourth Edition. 170 Illustrations. \$5.50  
 ———, Landmarks. 3d Edition. \$1.25  
 Handy, Anatomy. Illustrated. \$3.00  
 Jones, Sieveking & Payne. Pathological Anatomy. Illustrated. \$5.50  
 Morris, Anatomy of the Joints. Colored Illus. \$5.50  
 Virchow, Post-mortem Examinations. Second Edition. Illustrated. \$2.25  
 Wilkes & Moxon, Pathological Anat. 2d Ed. \$6.00  
 Wilson's Anatomy. 10th Edition. \$6.00
- ASTHMA**  
 Berkart, Pathology and Treatment of. \$2.50  
 Thorowgood, Nature and Treatment of. \$1.50
- ATLASES, PLATES AND DIAGRAMS.**  
 Bentley & Trimens, Medicinal Plants. Full Botanical Descriptions and Colored Plates of all Plants Employed in Medicine, their Properties and Uses. 4 vols. 4to, half morocco. \$90.00  
 Bock, Atlas of Anatomy, 38 Col. plates. Roan. \$15.00  
 Flower, Diagrams of the Nerves of the Human Body. 7 Double-page Plates, and Letter Press. 4to. \$3.50  
 Frieripie, Anat. Atlas. 75 Pl. Plain, \$5.00; Col. \$10.00  
 Godlee, Atlas of Human Anatomy. 48 Colored Plates. Over 200 Figures. 4to Volume of Plates, and 8vo Volume of Text. \$30.00  
 Hutchinson, Illustrations of Clinical Surgery, Consisting of Plates and Wood Cuts. 4to. \$25.00  
 Parts 11, 12, 13, 14, of Vol. 11, now ready, each \$2.50  
 Jones, Atlas of Diseases of the Membrana Tympani. 62 Colored Figures. \$6.00  
 Liebreich, Atlas of Ophthalmoscopy. 12 Chromo-lithographic Plates, 59 Figures. 2d Ed. \$13.00  
 Martin, Atlas of Obstetrics and Gynaecology. 98 Full-page Plates. 4to. \$12.00  
 Marshall, Diagrams of the Human Body. 11 Life-sized, Col. Plates. Sheets, \$50.00; Mounted, \$80.00  
 Schultze, Obstetrical Plates. Life Size. 20 in the Set. Sheets, \$15.00; Mounted, \$25.00  
 Wedl, Atlas of the Pathology of the Teeth. Colored Plates. 4to. \$20.00
- BRAIN AND INSANITY.**  
 Bucknill & Tuke, Psychological Medicine. Fourth Edition. Illustrated. \$3.00  
 Sankey, Mental Diseases. \$3.00  
 Sheppard, On Madness. \$2.25  
 Wood, Brainwork and Overwork. .50
- CANCER.**  
 Collis, Diagnosis and Treatment of. Col. Plates. \$3.00  
 Cripps, Cancer of the Rectum. Illustrated. \$2.40  
 Marsden, Treatment of. Second Edition. Illus. \$3.00  
 Purcell, On Cancer, Its Allies and Other Tumors, with Treatment. Illustrated. \$3.75
- CHEMISTRY.**  
 Allen, Commercial Organic Analysis. 2 Vols. \$8.50  
 Bloxam, Chemistry, Organic and Inorganic. 295 Illustrations. Fourth London Edition. \$4.00  
 ———, Laboratory Teaching. 89 Illus. \$1.75  
 Bernay, Notes for Chemistry Students. 6th Ed. \$1.25  
 Frankland, How to Teach Chemistry. Illus. \$1.25  
 ———, Water Analysis. Illustrated. \$1.00  
 Hardwich, Photographic Chemistry. 8th Ed. \$2.00  
 Kollmyer, Chemia Coartata; Key to Chemistry. \$2.25  
 Muter, Medical and Pharmaceutical Chemistry. \$6.00  
 Reese, Syllabus of Medical Chemistry. \$1.00  
 Sutton, Volumetric Analysis. Illus. 4th Ed.  
 Tidy, Modern Chemistry; Organic and Inorganic. \$5.00  
 Vacher, Primer of Chemistry. .50  
 Wheeler, Medical Chemistry. Second Ed. \$3.00
- CHILDREN, DISEASES OF.**  
 Day, Diseases of Children. Second Edition. Just ready. Cloth, \$5.00; sheep, \$6.00  
 Dillnberger, Diseases of Women and Children. \$1.50  
 Ellis, Diseases of Children. 4th Ed. \$3.50  
 ———, What Every Mother Should Know .75  
 Hale, The Management of Children. .75  
 Hillier, The Diseases of Children. \$2.00  
 Meigs & Pepper, Diseases of Children. Seventh Edition. Cloth, \$6.00; sheep, \$7.00  
 Smith, Diseases of the Lungs in Children. \$2.50  
 Tanner, Diseases of Infancy and Childhood. \$3.00
- CLIMATOLOGY AND HEALTH RESORTS.**  
 Madden, Health Resorts for Chronic Diseases. \$2.50  
 Wilson, The Ocean as a Health Resort. \$2.50
- DYSPEPSIA AND INDIGESTION.**  
 Edwards, Dyspepsia and How to Avoid It. .75  
 ———, Constipation. .75  
 Gill, Indigestion, a New Method of Treatment. \$1.25  
 Habershon, The Varieties of Dyspepsia and Their Treatment. \$1.75  
 Leared, Imperfect Digestion and Its Treatment. \$1.50
- DEFORMITIES.**  
 Adams, Club-Foot, Causes and Treatment. \$5.00  
 Brodhurst, Anchylosis. Fourth Edition. \$2.00  
 Coles, Deformities of the Mouth, and Their Treatment. Third Edition. 170 Illustrations. \$4.50  
 Mac Ewen, Osteotomy. Illustrated. \$3.00
- DENTISTRY.**  
 Coles, Deformities of the Mouth, with Treatment. Third Edition. 170 Illustrations. \$4.50  
 ———, Dental Mechanics. 140 Illustrations. \$3.00  
 ———, Dental Student's Note-Book. New Ed. \$1.00  
 Flagg, Plastics and Plastic Filling. Illus. \$3.00  
 Heath, Diseases of the Jaws. 150 Illus. \$4.25  
 Hunter, Mechanical Dentistry. 100 Illus. \$2.25  
 Harris, Principles and Practice of Dentistry. Tenth Edition. 400 Illus. Cloth, \$6.50; sheep, \$7.50  
 ———, Dental and Medical Dictionary. Fourth Edition. Cloth, \$6.50; sheep, \$7.50  
 Leber & Rottenstein, Dental Caries. \$1.25  
 Richardson, Mechanical Dentistry. Third Edition. 185 Illustrations. Cloth, \$4.00; sheep, \$4.75  
 Sewell, Dental Anatomy and Surgery. Illus. \$1.50  
 Stocken, Dental Materia Medica and Therapeutics. Second Edition. \$2.25  
 Tomes, J., Dental Surgery. Second Edition. \$5.00  
 Tomes, C. S., Dental Anatomy. Second Edition. 179 Illustrations. *[In Press.]*  
 Taft, Operative Dentistry. 3d Ed. \$4.25  
 Wedl, Dental Pathology. Cloth, \$3.50; sheep, \$4.50  
 ———, Atlas of the Pathology of the Teeth. \$10.00  
 White, The Mouth and Teeth. Illustrated. .50
- DICTIONARIES.**  
 Cleveland, Pocket Medical Lexicon. Twenty-sixth Edition. Cloth, .75; tucks, \$1.00

Cooper, Surgical Dictionary. Two Volumes. \$12.00  
 Harris, Dictionary of Medicine and Dentistry.  
 Fourth Edition. Cloth, \$6.50; sheep, \$7.50  
 Longley, Medical Lexicon. Cloth, \$1.00; tucks, \$1.25  
 Mayne, Medical Vocabulary. An Explanation of all  
 Synonyms, Names and Terms. \$3.00

## EAR, DISEASES OF.

Burnett, Hearing and How to Keep It. Illus. .50  
 Dalby, Diseases and Injuries of the Ear. Illus. \$1.50  
 Jones, H. M., Aural Surgery. Illustrated. \$1.50  
 ———, Atlas of Diseases of the Membrana Tym-  
 pani. Colored Plates, 62 Figures. \$6.00.  
 Woakes, Deafness, Giddiness, and Noises in the  
 Head. Second Edition. Illustrated. \$2.50

## ELECTRICITY.

Althaus, Medical Electricity. 3d Ed. 146 Ill. \$6.00  
 Reynolds, Clinical Uses of Electricity. 2d Ed. \$1.00  
 Tibbitts, Medical Electricity. 64 Illustrations. \$1.50

## EYE, DISEASES OF.

Carter, Eyesight, Good and Bad. Second Edition.  
 50 Illustrations. \$1.50  
 Dagnuet, Manual of Ophthalmoscopy. Illus. \$1.50  
 Fenner, Vision, Its Optical Defects. 74 Illus. \$3.50  
 Gowers, Manual and Atlas of Ophthalmoscopy. 112  
 Illustrations, some colored. \$6.00  
 Harlan, Eyesight and How to Care for It. Illus. .50  
 Hay, Sarcomatous Tumor of the Orbit in a Child.  
 Illustrated. .50  
 Higgins, Hand-book of Ophthalmic Practice. .60  
 Jones, Defects of Sight and Hearing. .50  
 Liebreich, Atlas of Ophthalmoscopy. 59 Colored  
 Figures. Second Edition. 4to. \$13.00  
 Macnamara, Diseases of the Eye. Third Edition.  
 Colored Plates and Wood Cuts. \$4.00  
 Morton, On Refraction. \$1.00  
 Walton, Diseases of the Eye. Third Edition. Illus-  
 trated. 1200 pages. \$9.00  
 Wolfe, Diseases of the Eye. Illustrated. [*In Press.*]

## FEVERS.

Allan, Fever Nursing. Illus. .75  
 Stillé, Epidemic Meningitis, \$2.00

## HEADACHES.

Day, Headaches, Their Nature, Causes and Treat-  
 ment. Third Edition. Illustrated. \$2.00  
 Living, Megrin, or Sick Headache and Allied Dis-  
 orders. Illustrated. \$5.50  
 Wright, Headaches, Their Causes and Cure. .50

## HEART.

Balfour, Diseases of the Heart. 2d Ed. [*In Press.*]  
 Barth & Roger, Auscultation and Percussion. \$1.00  
 Fothergill, Treatment of Diseases of the Heart.  
 Formulæ and Illustrations. \$3.50  
 Hayden, Diseases of the Heart and Aorta. 81 Illus-  
 trations. 1200 pages. Two Volumes. \$6.00  
 Sansom, Diseases of the Heart. Illustrated. \$2.00  
 Stokes, Diseases of the Heart and Aorta. \$3.00

## HISTOLOGY.

(See also *Pathology.*)

Gibbes, Practical Histology and Pathology. \$1.00  
 Rutherford, Practical Histology. 3d Ed. [*In Press.*]

## HOSPITALS.

Burdett, Cottage Hospitals. Second Edition. Plans  
 and Illustrations. \$4.50  
 ———, Pay Hospitals and Paying Wards. \$2.25  
 Domville, Hospital Nursing. Second Edition. .75

## HYGIENE.

Bible Hygiene. By a Physician. \$1.00  
 Bennett, Nutrition in Health and Disease. \$2.50  
 Cornfield, Sanitary Construction and Arrangement of  
 Dwelling Houses. Plans and Illus. 2d Ed. \$1.25  
 Frankland, Water Analysis for Sanitary Purposes,  
 Illustrated. \$1.00  
 Hartshorne, Our Homes, Their Sanitary Arrange-  
 ments. Illustrated. .50  
 Lincoln, School Hygiene. .50  
 Parkes, Practical Hygiene. 5th Ed. Illus. \$6.00  
 Teale, Dangers to Health. 3d Edition. Illus. \$3.50  
 Wilson, G., Hygiene and Sanitary Science. \$2.75  
 ———, Health and Healthy Homes. A Guide to  
 Domestic Hygiene. 314 pages. \$1.00  
 ———, *Hygiene*, Drainage for Health. Easy Lessons in  
 Sanitary Science. Illustrated. \$1.00  
 ———, Naval Hygiene, Human Health, and the  
 Means for Preventing Disease\* Illustrated. \$3.00  
 Edwards, On Malaria. .75

## JOURNAL.

The American Specialist. A Journal of Medicine  
 and Surgery. Monthly. Per Annum, \$1.50

## KIDNEYS.

Black, Bright's Disease of the Kidneys. 20 Illus. \$1.50  
 Edwards, How Persons Afflicted with Bright's Dis-  
 ease Ought to Live. .75  
 Greenhow, Addison's Disease. Numerous Cases  
 and Colored Illustrations. \$3.00  
 Tyson, Bright's Disease and Diabetes. Illus. \$3.50

## LUNGS AND CHEST, DISEASES OF.

(See also *Throat.*)

Bennett, Consumption, Treated by Hygiene, Climate  
 and Medicine. Third Edition. \$2.50  
 Barth & Roger, Auscultation and Percussion. \$1.00  
 Dobell, Loss of Weight, Blood Spitting, etc. \$4.00  
 ———, Winter Cough, Catarrh, Bronchitis, etc. \$3.50  
 Bruen, Pocket-book of Physical Diagnosis. Original  
 Illustrations. Just issued. 12mo. 256 pp. \$2.00  
 Greenhow, Bronchitis. \$1.50  
 Waters, Diseases of the Chest. 2d Ed. \$4.00

## MANUALS FOR STUDENTS.

Mendenhall, Student's Vade Mecum. Illus. \$2.00  
 Atthill, Diseases of Women. Fifth Ed. Illus. \$2.25  
 Bernay, Notes for Chemical Students. \$1.25  
 Carter, Practical Medicine. \$3.00  
 Charteris, Practice of Medicine. Illustrated. \$2.00  
 Clay, Obstetrics. Illustrated. \$2.00  
 Dalby, On the Ear. Illustrated. \$1.50  
 Fenwick, Outlines of Practice. Illustrations and  
 Formulæ. \$2.00  
 Gallabin, Diseases of Women. 63 Illus. \$2.00  
 Heath, Minor Surgery. Sixth Edition. Illus. \$2.00  
 ———, Surgical Diagnosis. \$1.50  
 Marshall & Smith, Analysis of the Urine. \$1.00  
 Mears, Practical Surgery. Illustrated. \$2.00  
 Roberts, Practice of Midwifery. 95 Illus. \$2.00  
 Sewill, Dental Anatomy and Surgery. Illus. \$1.50  
 Smith, Practical Gynæcology. Illustrated. \$1.50  
 Swain, Surgical Emergencies. 82 Illustrations. \$2.00  
 Tyson, Practical Examination of the Urine. Third  
 Edition. Illustrated. \$1.50  
 Thorowgood, Materia Medica. Illustrated. \$2.00  
 Warner, Guide to Case Taking. \$1.75

## MARRIAGE.

Ryan, The Philosophy of Marriage. \$1.00  
 Walker, Intermarriage, Its Effects on Health, Beauty,  
 etc. Illustrated. \$1.00

## MATERIA MEDICA.

(See also *Therapeutics.*)

Biddle, Materia Medica, Eighth Edition. \$4.00  
 Royle & Harley, Materia Medica and Therapeutics.  
 139 Illustrations. \$5.00  
 Stocken, Dental Materia Medica and Therapeutics.  
 Second Edition. \$2.25  
 Thorowgood, Guide to Materia Medica. \$2.00

MEDICAL JURISPRUDENCE AND  
TOXICOLOGY.

Ogston, Medical Jurisprudence. Illustrated. \$6.00  
 Tanner, Poisons and Their Antidotes. Fourth Ed. .75  
 Woodman & Tidy, Medical Jurisprudence and  
 Toxicology. Illustrated. Cloth, \$7.50; sheep, \$8.50

## MICROSCOPY.

Carpenter, The Microscope and Its Revelations.  
 Sixth Edition. 500 Illustrations. \$5.50  
 Beale, How to Work with the Microscope. Fifth  
 Edition. 400 Illustrations. \$7.50  
 ———, The Microscope in Medicine. Fourth Edi-  
 tion. 500 Illustrations. \$7.50  
 Marsh, Section Cutting. Illustrated. .75  
 Martin, Microscopic Mounting. 140 Illustrations.  
 Second Edition. \$2.75  
 Macdonald, Microscopical Examination of Water.  
 20 Plates. \$2.75  
 Wythe, The Microscopist. Fourth Edition. 252 Il-  
 lustrations. Cloth, \$5.00; sheep \$6.00

## MISCELLANEOUS.

Beale, Life and Vital Action. \$2.00  
 ———, Life Theories and Religious Thought. Illus-  
 trated. \$2.00  
 ———, Slight Ailments. \$1.75  
 Bennett, Nutrition in Health and Disease. Third  
 Edition. \$2.50  
 Carson, History of the University of Pennsylvania. \$2.09



Cohen, Inhalation, Its Therapeutics, etc.	\$2.50
Cobbold, Parasites; the Entozoa of Man and Animals. 85 Illustrations.	\$5.00
Dulles, Emergencies.	.50
Edwards, Constipation.	.75
———, Malaria.	.75
Gross, American Medical Biography. Illus.	\$3.50
———, Life of John Hunter. Illustrated.	\$1.50
Hardwicke, Medical Education.	\$3.00
Hood, On Gout and Rheumatism. Second Ed.	\$3.50
Holden, The Sphygmograph. 300 Illustrations.	\$2.00
Hunter, Prototype Portrait of.	.50
Kane, On the Opium, Morphia, Chloral and other Habits. Illustrated.	\$1.50
Kirby, On Phosphorus. New Edition.	\$1.00
Lizars, On Tobacco.	.50
Mathias, Legislative Manual and Rules of Order.	.50
Overman, Practical Mineralogy.	\$1.00
Oldberg, Metric System in Medicine. Formulæ.	\$1.50
Piesse, The Art of Perfumery. 366 Illus.	\$5.50
Pennsylvania Hospital Reports. Each.	\$2.00
Piggot, Copper Mining and Copper Ore.	\$1.00
Smith, On Ringworm and Its Treatment. Illus.	\$1.00
Smythe, Medical Heresies.	\$1.25
Svevking, Life Assurance.	\$2.00
Transactions of the College of Physicians of Phila- delphia. Four Volumes. Each	\$2.50
Turnbull, Anaesthesia. Second Edition. Illus.	\$1.50
Virchow, Post-mortem Examinations. Second Ed- ition. Illustrated.	\$1.25
Warner, Medical Case Taking.	\$1.75

## NERVOUS DISEASES.

Buzzard, Syphilitic Nervous Affections.	\$1.75
Flower, Diagrams of the Nerves. 7 Double-page Plates and Letter Press. 4to.	\$3.50
Gowers, Diseases of the Spinal Cord. Second Ed- ition. Illustrated.	\$1.50
Radcliffe, Epilepsy, Pain and Paralysis. Illus.	\$1.50

## NURSING.

Allan, Notes on Fever Nursing. Illustrated.	.75
Domville, Manual for Nurses. Second Edition.	.75
Smith, On the Training of Nurses. Illustrated.	\$2.00

## OBSTETRICS

Cazeaux, Practical Text-book of Midwifery. Seventh Edition. Illustrated. Cloth, \$6.00; sheep, \$7.00	
Clay, Obstetric Surgery. Illustrated.	\$2.00
Glisan, Midwifery. 130 Illus. Clo. \$4.00; sheep, \$5.00	
Meadows, Manual of Midwifery. 145 Illustrations. Second Edition.	\$2.00
Rigby and Meadows, Obstetric Memoranda. Fourth Edition.	.50
Roberts, Practical Midwifery. 95 Illustrations.	\$2.00
Savage, Surgery of the Female Pelvic Organs. Col- ored Plates. Second Edition.	[In Press.]
Schultze, Obstetric Diagrams, Life Size. 20 in Set. In Sheets, \$15.00; Mounted, \$25.00	

## OSTEOLOGY.

Holden, Human Osteology. Colored and other Illustrations. Sixth Edition.	\$5.50
Mac Ewen, Osteotomy. 51 Illustrations.	\$3.00
Macnamara, Diseases of the Bones and Joints.	\$4.25
Wagstaffe, Human Osteology. 83 Illustrations.	\$3.00

## PATHOLOGY.

(See also *Histology*.)

Gibbes, Practical Pathology and Histology.	\$1.00
Jones, Svevking & Payne, Pathological Anatomy. Illustrated.	\$5.50
Paget, Surgical Pathology. Third Edition. Illus- trated. Cloth, \$7.00; sheep, \$8.00	
Rindfleisch, Pathological Histology. 208 Illus- trations. Cloth, \$5.00; sheep, \$6.00	
Thudichum, Path. of the Urine. 2d Ed. Illus.	\$5.00
Virchow, Pathology.	\$5.00
Wedl, Dental Pathology. 105 Illustrations. Cloth, \$3.50; sheep, \$4.50	
———, Atlas of Pathology of the Teeth. Colored Plates. 4to.	\$12.00
Wilkes & Moxon, Pathological Anatomy.	\$6.00

## PHARMACY.

Beasley, Druggists' General Receipt Book.	\$2.25
———, Formulary.	\$2.25
Bentley & Trimens, Medicinal Plants. Colored Plates and Descriptions of Every Plant Employed in Medicine, Their Properties and Uses. Four Vols., half Morocco.	\$90.00
Mackenzie, Pharmacopœia of the Throat Hospital. Fourth Edition.	\$1.25
Muter, Pharmaceutical and Medical Chemistry.	\$6.00

Oldberg, The Metric System, Posological Tables and 300 Prescriptions.	\$1.50
———, The Unofficial Pharmacopœia. Over 700 Formulæ.	\$3.50
Piesse, The Manufacture of Perfumery, Cosmetics, Soaps, Tooth Powders, etc. 4th Ed. 366 Ill. \$5.50	
Sweringen, Pharmaceutical Lexicon. Cloth.	\$3.00
Tuson, Veterinary Pharmacopœia, Materia Medica and Therapeutics. Third Edition.	\$2.50

## PRACTICE.

Aitken, The Science and Practice of Medicine. Third Edition. Two Vols. Cloth, \$12.00; sheep, \$14.00	
Bruen, Physical Diagnosis. Illustrated.	\$2.00
Beale, Slight Ailments, and their Treatment.	\$1.75
Carter, Elements of Practical Medicine.	\$3.00
Charteris, Students' Hand-book of Practice. II.	\$2.00
Cormack, Clinical Studies. Illus. Two Vols.	\$5.00
Dunglison, Practitioner's Reference Book.	\$3.50
Fenwick, Outlines of Practice. Formulæ and II.	\$2.00
Foster, Clinical Medicine. Illustrated.	\$3.00
Maxson, Practice of Medicine.	\$3.00
Power, Holmes, Anstie & Barnes, Reports on the Progress of Medicine.	\$2.00
Roberts, Text-book of the Theory and Practice of Medicine. Third Edition. Cloth, \$5.00; sheep, \$6.00	
Trousseau, Clinical Medicine. Third Edition. Two Volumes. Cloth, \$8.00; sheep, \$10.00. Ditto Five Volumes. Sydenham Edition.	\$15.00
Tanner, Index of Diseases and their Treatment. Formulæ, etc.	\$3.00
Warner, Student's Guide to Case Taking.	\$1.75

## PHYSIOLOGY.

Beale, Bioplasm, or the Physiology of Life. II.	\$2.25
———, Protoplasm, or Matter and Life. Col. II.	\$3.00
Fulton, Physiology. Second Edition. Illus.	\$4.00
Kirke, Physiology. Tenth Edition.	\$5.00
Reese, Analysis of Physiology. Second Edition.	\$1.50
Sanderson, Hand-book of the Physiological Labora- tory. 350 Illus. Two Vols., cloth, \$7.00; One Vol., cloth, \$6.00; sheep, \$7.00	
———, Syllabus of Physiology. Second Ed.	\$1.50
Tyson, The Cell Doctrine. Second Ed. Illus.	\$2.00

## PRESCRIPTION BOOKS.

Beasley, 3000 Prescriptions, and Index of Diseases and Remedies. Fifth Edition.	\$2.25
Oldberg, The Metric Prescription Book. 300 Formu- læ and Posological Tables.	\$1.50
Pereira, Physician's Prescription Book. Sixteenth Edition. Cloth, \$1.00; Tucks, \$1.25	
Wythe, Physician's Pocket Dose and Symptom Book. Eleventh Edition. Cloth, \$1.00; Tucks, \$1.25	

## POPULAR MEDICINE.

## American Health Primers:

I. Hearing and How to Keep It. Chas H. Bur- nett, M.D. Illustrated.	.50
II. Long Life and How to Reach It. J. G. Rich- ardson, M.D.	.50
III. Summer and Its Diseases. Jas. Wilson, M.D.	.50
IV. Eyesight and How to Care For It. Geo. C. Harlan, M.D. Illustrated.	.50
V. The Throat and Voice. J. Solis Cohen, M.D. Illustrated.	.50
VI. The Winter and Its Dangers. Hamilton Os- good, M.D.	.50
VII. The Mouth and the Teeth. J. W. White, M.D. Illustrated.	.50
VIII. Brainwork and Overwork. H. C. Wood.	.50
IX. Our Homes. Henry Hartshorne. Illus.	.50
X. The Skin in Health and Disease. J. D. Bullock, M.D. Illustrated.	.50
XI. Sea Air and Sea Bathing. J. H. Packard, M.D.	.50
XII. School and Industrial Hygiene. D. L. Lin- coln, M.D.	.50
Carter, Eyesight, Good and Bad. Illustrated.	\$1.50
Chavasse, Culture and Training of Children.	\$1.00
Ellis, What Every Mother Should Know.	.75
Edwards, How Persons Afflicted with Bright's Dis- eases Ought to Live.	.75
———, Constipation Cured without Drugs.	.75
———, Dyspepsia and How to Avoid It.	.75
———, Malaria.	.75
Gill, On Indigestion. Second Edition.	\$1.25
Hale, The Management of Children. For Mothers.	.75
Hufeland, The Art of Prolonging Life.	\$1.00
Savory & Moore, Domestic Medicine.	.50
Tanner, Poisons and their Antidotes. Fourth Ed.	.75

Thompson, Coughs and Colds.	.60
Wilson, G., Guide to Domestic Hygiene.	\$1.00
Wilson, W. S., Sea Voyages for Health.	\$2.50
Wright, On Headaches, Their Causes and Cure.	Ninth Thousand.
Walker, Intermarriage for Health and Beauty. Illustrated.	\$1.00

## RECTUM.

Allingham, Diseases of the Rectum. Fourth Edition, Enlarged.	[In Press.]
Cripps, Cancer of the Rectum, and Treatment.	\$2.40

## SKIN AND HAIR.

Anderson, Eczema, Its Treatment, etc.	\$2.50
Buckley, Aid to Study of Skin Diseases. Paper.	.30
Cobbold, Parasites and Entozoa. 85 Illus.	\$5.00
Cottle, The Hair in Health and Disease.	.75
Fox, <i>Tilbury</i> , Atlas of Skin Diseases. 72 Quarto Colored Plates. 18 Parts, each \$2.00; or, One Volume, Cloth. 4to.	\$30.00
Wilson, Healthy Skin and Hair. Eighth Ed.	\$1.00

## STIMULANTS AND NARCOTICS.

Anstie, Stimulants and Narcotics.	\$3.00
Kane, The Opium, Chloral, Morphine and Hashisch Habits. Illustrated.	\$1.50
Lizars, On Tobacco, Its Use and Abuse.	.50
Miller, On Alcohol, Its Place and Power.	.50
Sansom, Chloroform. Its Administration.	\$1.50
Turnbull, Artificial Anæsthesia. 2d Ed. Illus.	\$1.50

## STOMACH.

Fenwick, The Stomach and Duodenum. Illus.	\$4.25
———, Atrophy of the Stomach. Illustrated.	\$3.20
Habershon, Diseases of the Stomach. Third Ed.	\$1.75

## SPECTROSCOPE.

Mac Munn, The Spectroscope in Medicine. Colored and other Illustrations.	\$3.00
--	--------

## SURGERY AND SURGICAL DISEASES.

(See also *Deformities, and Osteology.*)

Aveling, Influence of Posture on Women in Operations. Illustrated.	\$2.00
Clarke, Outlines of Surgery. Second Edition.	\$2.00
Cooper, Surgical Dictionary. Two Volumes.	\$12.00
Druitt, Surgery. 17th London Edition. 369 Illus.	\$5.00
Gant, Practice of Surgery. 2d Ed. Two Vols. 1700 pages. 1000 Illus. Cloth, \$11.00; sheep, \$13.00	
Heath, Operative Surgery. Col. Plates. 4to. \$14.00	
———, Minor Surgery. Sixth Edition. Formulæ and 115 Illustrations.	\$2.00
———, Surgical Diagnosis.	\$1.50
———, Injuries and Diseases of the Jaws. Second Edition. 150 Illustrations.	\$4.25
Holden's Landmarks, Medical and Surgical.	\$1.25
Hutchinson, Illustrations of Clinical Surgery. Cases Illustrated by Colored Plates, Wood Cuts, Photographs, etc. Parts 1-10 bound. Cloth, \$25.00	
Parts 11, 12, 13 and 14 ready. Each	\$2.50
Hewson, Earth as Applied in Surgery. Illus.	\$2.50
Mears, Practical Surgery. Illustrated.	\$2.00
Macnamara, Diseases of the Bones and Joints.	\$4.25
Mason, Surgery of the Face. 100 Illustrations.	\$2.25
Maunder, Operative Surgery.	\$2.00
———, Surgery of the Arteries. Illustrated.	\$1.50
Prince, Plastic and Orthopædic Surgery. Illus.	\$4.50
Swain, Surgical Emergencies. Illustrated.	\$2.00
Tomes, Dental Surgery. Second Ed. 263 Illus.	\$5.00
Toland, Practical Surgery. Second Edition.	\$4.50

## THROAT.

(See also *Lungs, and Asthma.*)

Cohen, Throat and Voice. Illustrated.	\$2.50
———, On Inhalation. Illus. Second Edition.	\$2.50
———, Croup, Its Relations to Tracheotomy.	\$1.00
Dobell, Winter Cough, Catarrh, Asthma, Bronchitis, etc. Third Edition. Illustrated.	\$3.50
Holmes, Vocal Physiology and Hygiene. Illus.	\$2.00
———, The Laryngoscope. Illustrated.	\$1.00
James, Sore Throat, Its Varieties and Treatment. Fourth Edition. Illus.	\$2.25
———, Laryngoscopy and Rhinoscopy. Third Edition. Illustrated.	\$2.00
Mackenzie, The Throat and Voice. Author's Edition. With Original Plates. Volume 1 ready. 112 Illustrations.	\$4.00.
Volume 11.	[In Press.]
———, Diphtheria.	.75
———, Growths in the Larynx.	\$2.00
———, Pharmacopœia. Fourth Edition.	\$1.25
Thompson, Coughs and Colds.	.60

## THERAPEUTICS.

(See also *Materia Medica and Action of Medicine.*)

Kidd, The Laws of Therapeutics.	\$1.25
Kirby, On Phosphorus. Fifth Edition.	\$1.00
Kane, Drugs That Enslave. The Opium, Chloral and Other Habits. Illustrated.	\$1.50
Mays, The Therapeutic Forces.	\$1.25
Waring, Practical Therapeutics. A Text-book. Third Edition. Cloth, \$4.00; sheep, \$5.00	

## URINE AND URINARY ORGANS.

Acton, On the Reproductive Organs. Fourth Ed.	\$2.50
Black, Renal, Urinary and Reproductive Organs.	\$2.00
Beale, Illustrations of One Hundred Urinary Deposits. On two Sheets. Each \$1.00; or, Mounted, \$1.25	
Curling, On the Testis, Spermatic Cord and Scrotum. Fourth Edition. Illustrated.	\$5.50
Coulson, The Bladder and Prostate Gland. Sixth Edition. Illustrated.	\$6.40
Gant, The Bladder, Prostate Gland and Urethra. Fourth Edition. Illustrated.	\$3.00
Hoff, Hæmaturia. Illustrated.	.75
Legg, The Examination of the Urine. Illustrated. Fifth Edition.	.75
Marshall & Smith, Chemical Analysis of the Urine. Illustrated.	\$1.00
Thompson, Diseases of the Urinary Organs. Fifth London Edition. Illustrated.	\$3.50
———, On Calculous Disease. Second Ed.	\$1.00
———, Lithotomy and Lithotripsy. 3d Ed.	\$3.50
———, Diseases of the Prostate. 4th Ed.	\$4.00
Tyson, Examination of Urine. Illus. 3d Ed.	\$1.50
Thudichum, Pathology of the Urine, and Complete Guide to Analysis. Second Edition. Illus.	\$5.00
Whittaker, Student's Primer on the Urine. II.	\$1.50

## VENEREAL DISEASES.

Durkee, On Gonorrhœa and Syphilis. 6th Ed. II.	\$3.50
Lewen, The Treatment of Syphilis. Illustrated.	\$1.50

## VISITING LIST.

Lindsay & Blakiston's Physician's Visiting List, Published Annually.	
--	--

## SIZES AND PRICES.

For 25 Patients weekly. Tucks, pockets, etc.,	\$1.00
50 " " " " " "	1.25
75 " " " " " "	1.50
100 " " " " " "	2.00
50 " " " 2 Vols. { Jan. to June }	2.50
100 " " " 2 Vols. { July to Dec. }	3.00

## INTERLEAVED EDITION.

For 25 Patients weekly, interleaved, tucks, etc.,	1.25
50 " " " " " "	1.50
50 " " " 2 Vols. { Jan. to June }	3.00
100 " " " 2 Vols. { July to Dec. }	3.00

## WATER.

Ekin, Potable Water. Second Edition.	.75
Fox, Examination of Water, Air and Food. II.	\$4.00
Frankland, Water Analysis. Illustrated.	\$1.00
Mac Donald, Microscopical Analysis of. Illus.	\$2.75

## WOMEN, DISEASES OF.

Agnew, Female Perineum. Illustrated.	\$1.50
Atthill, Diseases of Women. Fifth Edition.	\$2.25
Aveling, Posture in Gynæcology and Other Operations. Illustrated.	\$2.00
Byford, Diseases of Women. Third Edition. Illustrated. Cloth, \$5.00; sheep, \$6.00	
———, On the Uterus. Illustrated.	\$2.50
Dillnberger, Diseases of Women and Children.	\$1.50
Gallabin, Guide to the Diseases of Women. II.	\$2.00
Hewitt, Text-book of the Diseases of Women. Third Edition. Illustrated. Cloth, \$4.00; sheep, \$5.00	
Hodge, <i>H. Lennox</i> , Note-book for Cases of Ovarian Tumors. Diagrams.	.50
———, <i>Hugh L.</i> , Fœticide. Cloth, .50; paper, .30	
Martin, Atlas of Gynæcology and Obstetrics. Colored Plates and other Illustrations. With Text.	\$12.00
Smith, <i>Heywood</i> , Practical Gynæcology. Illus.	\$1.50
———, Dysmenorrhœa.	\$2.50
Savage, Surgery and Surgical Pathology of the Female Pelvic Organs. Colored Plates. New Ed.	\$5.00
Scanzoni, Diseases of Women.	\$5.00
Tilt, The Change of Life in Women. Third Ed. \$3.00	
———, Uterine Therapeutics. Fourth Ed.	\$3.50
Wells, Ovarian and Uterine Tumors. [In Press.]	
West, The Diseases of Women. Fourth Edition, Rewritten, Edited by Matthews Duncan.	\$5.00

Philadelphia, January 2d, 1882.

# ANNOUNCEMENT.

The Copartnership heretofore existing between Robert Lindsay and Presley Blakiston, under the name of Lindsay & Blakiston, Medical Publishers and Booksellers, is this day dissolved, by mutual consent.

**ROBERT LINDSAY.  
PRESLEY BLAKISTON.**

PRESLEY BLAKISTON having purchased from Mr. Robert Lindsay all his interest in the late firm, will continue the publication and sale of MEDICAL AND SCIENTIFIC BOOKS, AT No. 1012 WALNUT STREET.

His son, *Kenneth M. Blakiston*, and *Frank W. Robinson* having an interest in the business from this date, the name of the firm will be

**P. BLAKISTON, SON & CO.**

**MEDICAL, DENTAL, SCIENTIFIC**

AND

**PHARMACEUTICAL BOOKS**

PUBLISHED BY

**P. BLAKISTON, SON & CO., PHILADELPHIA.**

Any book in this catalogue can be had from or through booksellers in the principal cities in the United States, or will be forwarded free, by mail or express, upon receipt of the price by the publisher.

## AMERICAN HEALTH PRIMERS.

Edited by W. W. KEEN, M.D. Complete in 12 volumes, handsomely bound in cloth. Put up in a neat, strong box.

Price \$6.00  
Or sold separately, each .50

- |   |  |
|---|--|
| I. Hearing and How to Keep It. With illustrations. By CHAS. H. BURNETT, M.D.        | VII. The Mouth and the Teeth. With illustrations. By J. W. WHITE, M.D., D.D.S. |
| II. Long Life, and How to Reach It. By J. G. RICHARDSON, M.D.                       | VIII. Brain Work and Overwork. By H. C. WOOD, JR., M.D.                        |
| III. The Summer and Its Diseases. By JAS. C. WILSON, M.D.                           | IX. Our Homes. With Illustrations. By HENRY HARTSHORNE, M.D.                   |
| IV. Eyesight, and How to Care for It. With illustrations. By GEORGE C. HARLAN, M.D. | X. The Skin in Health and Disease. By L. D. BULKLEY, M.D.                      |
| V. The Throat and the Voice. With illustrations. By J. SOLIS COHEN, M.D.            | XI. Sea Air and Sea Bathing. By JOHN H. PACKARD, M.D.                          |
| VI. The Winter and Its Dangers. By HAMILTON OSGOOD, M.D.                            | XII. School and Industrial Hygiene. By D. L. LINCOLN, M.D.                     |

"In their practical teachings, learning, and sound sense, these volumes are worthy of all the compliments they have received. They teach what every man and woman should know, and yet what nine-tenths of the intelligent class are ignorant of, or at best, have but a smattering knowledge of."—*Chicago Inter-Ocean.*

"These handbooks of practical suggestion deserve hearty commendation. They are prepared by men whose professional competence is beyond question, and for the most part, by those who have made the subject treated the specific study of their lives."—*New York Sun.*



**ACTON, THE REPRODUCTIVE ORGANS.**

The Functions and Disorders of the Reproductive Organs. Their Physiological, Moral, and Social Relations. By WM. ACTON, M.R.C.S. Fourth Edition.

Price \$2.50

"In the work now before us, all essential detail upon its subject matter is clearly and scientifically given. We recommend it accordingly, as meeting a necessary requisition of the day, refusing to join in that opinion which regards the consideration of the topics in question as beyond the duties of the medical practitioner."—*The London Lancet*.

**ADAMS, ON CLUB FOOT.**

Its Causes, Pathology and Treatment. A Revised and Enlarged Edition. By WILLIAM ADAMS, F.R.C.S. 106 Wood Engravings and six Lithographic plates. 8vo.

Price \$5.00

"It is a work not only valuable to the specialist, but should be read by every practitioner who has anything to do with cases of club foot."—*Medical Record*.

**AGNEW, ON THE PERINEUM AND FISTULA.**

Lacerations of the Female Perineum and Vesico-vaginal Fistula. Their History and Treatment. With many Illustrations. By D. HAYES AGNEW, M.D., Professor of Surgery, University of Pennsylvania. 8vo.

Price \$1.50

So many applications having been made for these papers, as originally issued, the author has thought best, after a thorough revision, to place them before the profession in book form.

**AITKEN, PRACTICE OF MEDICINE.**

The Science and Practice of Medicine. By WILLIAM AITKEN, M.D., Edinburgh. Third American from Sixth London Edition, greatly enlarged, re-modeled and carefully revised; with additions by MEREDITH CLYMER, M.D., formerly Professor of Practice, University of New York. With 180 Illustrations and large colored map, showing the Geographical Distribution of Disease. Large 8vo. 2 vols.

Price, Cloth \$12.00; Sheep \$14.00

"The representative book of Medical science and practice."—*London Lancet*.

"The additions that have been made by the American Editor are copious and important."—*American Journal Medical Science*.

"The author has unquestionably performed a service to the profession of the most valuable kind."—*The Practitioner*.

"It would be difficult to point out anything that cannot be found in Aitken."—*Glasgow Medical Journal*.

**ALLEN, COMMERCIAL ORGANIC ANALYSIS.**

An Introduction to the Practice of Commercial Organic Analysis. By ALFRED H. ALLEN, F.C.S. Vol. I. Cyanogen Compounds, Alcohols and their Derivatives, Phenols, Acids, etc. 8vo.

Price \$3.50

Vol. II now ready. 8vo.

Price \$5.00

Being a treatise on the Properties, Analytical Examination, and Modes of Assaying the various Organic Chemicals and Preparations employed in the Arts, Manufactures, Medicine, etc.

**ALLAN, FEVER NURSING.**

Notes on Fever Nursing. Addressed to nurses in hospital and private life. By JAMES W. ALLAN, M.D. 12mo. Illustrated.

Price .75

**ALLINGHAM, DISEASES OF THE RECTUM.**

Fistula, Hæmorrhoids, Painful Ulcer, Stricture, Prolapsus, and other Diseases of the Rectum, their Diagnosis and Treatment. By WILLIAM ALLINGHAM, F.R.C.S. Fourth Edition, enlarged. 8vo.

Price \$3.00

"No book on this special subject can at all approach Mr. Allingham's in precision, clearness and practical good sense."—*London Medical Times and Gazette*.

"It is, as indeed the verdict of the profession has already pronounced it, one of the very best works on Diseases of the Rectum."—*American Journal of Medical Science*.

**ALTHAUS, MEDICAL ELECTRICITY.**

A Treatise on Medical Electricity, Theoretical and Practical, and its Use in the Treatment of Paralysis, Neuralgia, and other Diseases. By JULIUS ALTHAUS, M.D. Third Edition, Enlarged. 246 Illustrations. 8vo.

Price \$6.00

In revising this new edition the author has carefully brought each section up with the latest knowledge of the subject.



**ANDERSON, ON ECZEMA.**

The Pathology and Treatment of the various Eczematous Affections or Eruptions of the Skin. By MCCALL ANDERSON, M.D. Third Revised and Enlarged Edition. 8vo. Price \$2.50

**ANSTIE, STIMULANTS AND NARCOTICS.**

With special researches on the Action of Alcohol, Ether and Chloroform on the Vital Organism. By FRANCIS E. ANSTIE, M.D. 8vo. Price \$3.00

"He is an original worker and independent thinker. His opinions and conclusions are valuable, and cannot be neglected."—*American Medical Journal*.

**ATTHILL, DISEASES OF WOMEN.**

Clinical Lectures on Diseases Peculiar to Women. By LOMBE ATTHILL, M.D. 5th edition, revised and enlarged, with numerous illustrations. 12mo. Cloth. Price \$2.25

"It is the concentrated essence of the knowledge of one who has become wise by reason of long and well-digested experience in the subjects treated."—*American Journal of Medical Science*.

"The work is one of great value to the general practitioner."—*American Journal of Obstetrics*.

**AVELING, POSTURE IN OPERATIONS.**

The Influence of Posture on Women in Gynecic and other Operations. By J. H. AVELING, M.D. Illustrated. 8vo. Price \$2.00

A subject which hitherto has received but little attention is here treated in a very thorough manner, showing the importance of certain postures, and the various diseases produced by awkward and unhealthy positions.

**BALFOUR, ON THE HEART AND AORTA.**

Clinical Lectures on Diseases of the Heart and Aorta. By G. W. BALFOUR, M.D. Illustrated. 2d Edition. [*Preparing*]

"The whole work reflects much credit on its author, and firmly establishes his reputation as an authority on the important diseases of which he treats."—*London Practitioner*.

**BARTH AND ROGER, AUSCULTATION AND PERCUSSION.**

A Manual for the Student. By M. BARTH and M. HENRI ROGER. Translated from the 6th French Edition. 12mo. Price \$1.00

**BIBLE HYGIENE;**

Or, Health Hints. By a Physician. This book has been written, first, to impart in a popular and condensed form the elements of Hygiene; second, to show how varied and important are the Health Hints contained in the Bible, and third, to prove that the secondary tendency of modern Philosophy runs in a parallel direction with the primary light of the Bible. 12mo. Price \$1.00

"The scientific treatment of the subject is quite abreast of the present day, and is so clear and free from unnecessary technicalities that readers of all classes may peruse it with satisfaction and advantage."—*Edinburgh Medical Journal*.

**BIDDLE, MATERIA MEDICA. Eighth Edition.**

Materia Medica for the Use of Students. By JOHN B. BIDDLE, M.D., Late Professor of Materia Medica at Jefferson Medical College, Philadelphia. 8th edition, Revised, Enlarged and Illustrated. 8vo. Price \$4.00

"The additions are valuable, and we must congratulate the author upon having improved what was already so useful a work, both to the student and physician."—*Phila. Medical and Surgical Reporter*.

"It has been the design of the author to present in his work a text-book for the student. It is brief, and yet sufficiently comprehensive. His style is clear and yet succinct. He covers the ground—covers it well, and cumbers his work with nothing superfluous."—*Atlanta Medical and Surgical Journal*.

"One thing that particularly recommends this work to the student is, that the book is not so large as to discourage and cause him to feel that it is impossible for him to get over it and so much else in the short time before him."—*St. Louis Medical and Surgical Journal*.

"It contains, in a condensed form, all that is valuable in materia medica, and furnishes the medical student with a complete manual on this subject."—*Canada Lancet*.

**BLACK, THE REPRODUCTIVE AND RENAL ORGANS.**

The Functional Diseases of the Renal, Urinary and Reproductive Organs, with a General View of Urinary Pathology. By D. CAMPBELL BLACK, M.D., F.R.C.S. 12mo. Price \$2.00

"The title of this book sufficiently indicates its character and scope. Some of the chapters are almost exhaustive of their topics. Thus, in the chapter on spermatorrhœa, the whole philosophy and therapeutics of this vexatious condition is given with unusual clearness."—*Cincinnati Lancet and Observer*.

BY SAME AUTHOR.

**DISEASES OF THE KIDNEYS.**

Lectures on Bright's Disease of the Kidneys. Delivered at the Royal Infirmary, Glasgow. With 20 illustrations. 8vo. Price \$1.50

**BLOXAM. CHEMISTRY, Inorganic and Organic. Fourth Edition.**

With Experiments. By CHARLES L. BLOXAM, Professor of Chemistry in King's College, London, and in the Department for Artillery Studies, Woolwich. Fourth edition. With nearly 300 Engravings. 8vo. Price \$4.00  
A most complete Text-Book for Schools and Colleges.

"Professor Bloxam has given us a most excellent and useful practical treatise. His 666 pages (now 700) are crowded with facts and experiments, nearly all well chosen, and many quite new, even to scientific men. It is astonishing how much information he often conveys in a few paragraphs. We might quote fifty instances of this."—*Chemical News*.

**BLOXAM. LABORATORY TEACHING. Fourth Edition.**

Progressive Exercises in Practical Chemistry. By CHARLES L. BLOXAM, Professor of Chemistry in King's College, London, etc. Fourth edition. With 89 engravings. 12mo. Price \$1.75

This work is intended for use in the Chemical Laboratory, by those who are commencing the study of Practical Chemistry. It contains:—

1. A series of simple Tables for the analysis of unknown substances of all kinds.
2. A brief description of all the practically important single substances likely to be met with in ordinary analysis.
3. Simple directions and illustrations relating to Chemical Manipulation.
4. A system of Tables for the detection of unknown substances with the aid of the Blowpipe.
5. Short instructions upon the purchase and preparation of the tests intended for those who have not access to a Laboratory.

"A great amount of valuable practical information is here condensed into a book of 260 pages, such as only a practical teacher could prepare."—*New England Journal of Education*.

**BRUEN. PHYSICAL DIAGNOSIS. Just Ready.**

A Pocket Book of Physical Diagnosis, for Physicians and Students. By EDWARD T. BRUEN, M.D., Asst. Prof. of Clinical Medicine, University of Penn'a. Illustrated by Original Wood Engravings. 12mo. Extra Cloth. Price \$2.00

**BENNETT. NUTRITION IN HEALTH AND DISEASE.**

A Contribution to Hygiene and Clinical Medicine. By J. HENRY BENNETT, M.D. Third Edition, Revised and Enlarged. Cloth. Price \$2.50

BY SAME AUTHOR.

**THE TREATMENT OF PULMONARY CONSUMPTION BY HYGIENE, CLIMATE AND MEDICINE.**

With an Appendix on the Sanitaria of the United States, Switzerland and the Balearic Islands. Third Edition much Enlarged. Price \$2.50

"Any physician may take it up with every feeling of confidence that the views enunciated by the author will be found to be able, honest and orthodox."—*Medico-Chirurgical Review*.

**BERKART, ASTHMA.**

The Pathology and Treatment of Asthma. By JOSEPH B. BERKART, M.D. 8vo. Price \$2.50

**BEALE ON SLIGHT AILMENTS.**

Slight Ailments, Their Nature and Treatment. By LIONEL S. BEALE, M.D., F.R.S., Professor of Practice, King's Medical College, London. 12mo. Price \$1.75

## OUTLINE OF CONTENTS.

Introductory. The Tongue in Health and Slight Ailments. Appetite. Nausea. Thirst. Hunger. Indigestion, its Nature and Treatment. Constipation, its Treatment. Diarrhœa. Vertigo. Giddiness. Biliaryness. Sick Headache. Neuralgia. Rheumatism. The Fevcrish and Inflammatory State. Of the Actual Changes in Fever and Inflammation. Common Forms of Slight-Inflammation, etc., etc.

"We venture to say that among the numerous medical publications issued during 1880, there has been none which will prove more useful to the young general practitioner, for whom it is really intended, than this volume, while the time of the older physician might be much more unprofitably spent."—*American Journal of Medical Science*.

BY SAME AUTHOR.

**ON LIFE AND VITAL ACTION IN HEALTH AND DISEASE.**

12mo.

Price \$2.00

**THE USE OF THE MICROSCOPE IN PRACTICAL MEDICINE.**

For Students and Practitioners, with full directions for examining the various secretions, etc., in the Microscope. Fourth Edition. 500 Illustrations. Much enlarged. 8vo.

Price \$7.50

"We have before us Prof. BEALE's work, *The Microscope in Medicine*, a book which it gives us pleasure to recommend to every student of microscopy, whether he be a physician or naturalist."—*Journal of the Franklin Institute, Philadelphia*.

"As a microscopical observer, and a histological manipulator, his (Dr. BEALE) skill and eminence are generally conceded."—*Popular Science Monthly*.

**HOW TO WORK WITH THE MICROSCOPE.**

A Complete Manual of Microscopical Manipulation, containing a full description of many new processes of investigation, with directions for examining objects under the highest powers, and for taking photographs of microscopic objects. Fifth Edition. Containing over 400 Illustrations, many of them colored. Octavo.

Price \$7.50

"The Encyclopædic character of this last edition of Dr. BEALE's well known work on the *Microscope* renders it impossible to present an abstract of its contents; suffice it to say, that anything in his department upon which the physician can desire such information will be found here, and much more in addition. It is, moreover, a storehouse of facts, most valuable to the physician, and is indispensable to every one who uses the microscope."—*American Journal of Medical Science*.

**BIOPLASM.**

A Contribution to the Physiology of Life, or an Introduction to the Study of Physiology and Medicine, for Students. With numerous Illustrations.

Price \$2.25

**PROTOPLASM; or MATTER AND LIFE.**

Third Edition, very much enlarged. Nearly 350 pages. Sixteen Colored Plates: Part I. DISSENTIENT. Part II. DEMONSTRATIVE. Part III. SUGGESTIVE. One volume.

Price \$3.00

**LIFE THEORIES; Their Influence upon Religious Thought.**

Six Colored Plates.

Price \$2.00

**ONE HUNDRED URINARY DEPOSITS,**

On two sheets, for the Hospital, Laboratory, or Surgery. Each Sheet \$1.00, or on Rollers,

Price \$1.25

**BERNAY, CHEMISTRY.**

Notes for Students in Chemistry. Compiled from Fowne's and other manuals. By ALBERT J. BERNAY, PH.D. Sixth Edition. 12mo.

Price \$1.25

**BOCK, ANATOMY.**

An Atlas of Human Anatomy. By Prof. C. E. BOCK, of Berlin. Thirty-seven Colored Plates, containing about 200 figures. Quarto. Half Roan. Price \$15.00

This is one of if not the best Anatomical Atlas now to be had, and its production in Germany makes it certainly the cheapest.



**BEASLEY. THE BOOK OF PRESCRIPTIONS.**

Containing over 3100 Prescriptions, collected from the Practice of the most Eminent Physicians and Surgeons—English, French and American; a Compendious History of the Materia Medica, Lists of the Doses of all Official and Established Preparations, and an Index of Diseases and their Remedies. By HENRY BEASLEY. Fifth Edition, Revised and Enlarged. Price \$2.25

BY SAME AUTHOR.

**THE DRUGGIST'S GENERAL RECEIPT-BOOK.**

Comprising a copious Veterinary Formulary; numerous Recipes in Patent and Proprietary Medicines, Druggists' Nostrums, etc.; Perfumery and Cosmetics; Beverages, Dietetic Articles and Condiments; Trade Chemicals, Scientific Processes, and an Appendix of Useful Tables. Eighth Edition. Price \$2.25

**THE POCKET FORMULARY and Synopsis of the British and Foreign Pharmacopœias.**

Comprising Standard and Approved Formulæ for the Preparations and Compounds Employed in Medical Practice. Tenth Edition. 511 pp. 18mo. Price \$2.25

**BENTLEY AND TRIMEN'S MEDICINAL PLANTS.**

A New Illustrated Work, containing full botanical descriptions, with an account of the properties and uses of the principal plants employed in medicine, especial attention being paid to those which are officinal in the British and United States Pharmacopœias. The plants which supply food and substances required by the sick and convalescent are also included. By R. BENTLEY, F.R.S., Professor of Botany, King's College, London, and H. TRIMEN, M.B., F.H.S., Department of Botany, British Museum. Each species illustrated by a colored plate drawn from nature. In Forty-two parts. Eight colored plates in each part.

Price \$2 each, or handsomely bound in 4 volumes, Half Morocco, \$90.00

"It would be impossible to enumerate all the new plants that are here delineated. The result is a work which, from all points of view, is a credit to the scientific literature of the day."—*London Lancet*.

"It is an indispensable work of reference to every one interested in pharmaceutical Botany."—*London Pharmaceutical Journal*.

"This work may be recommended as a most useful one to druggists, and all who desire to be familiar with the Botany of Medicinal Plants."—*Druggists' Circular*.

"The work when complete (it is now complete) will be the most valuable compend of Medical Botany ever published."—*Boston Journal of Chemistry*.

**BRADLEY, ANATOMY.**

Comparative Anatomy and Physiology. By S. M. BRADLEY, F.R.C.S. Sixty Illustrations. Third Edition. Price \$2.00

**BRUNTON, ACTION OF MEDICINES.**

Experimental Investigation of the Action of Medicines. Part I, Circulation. By T. LAUDER BRUNTON, M.D., F.R.S. Second Edition. [*Preparing*]

**BYFORD. DISEASES OF WOMEN. New Revised Edition.**

The Practice of Medicine and Surgery, as applied to the Diseases of Women. By W. H. BYFORD, A.M., M.D., Professor of Obstetrics and The Diseases of Women and Children, in the Chicago Medical College. Third Edition. Revised and Enlarged, much of it rewritten, with numerous additional illustrations.

Price, in Cloth \$5.00; Leather, \$6.00

"The treatise is as complete a one as the present state of our science will admit of being written. We commend it to the diligent study of every practitioner and student, as a work calculated to inculcate sound principles and lead to enlightened practice."—*New York Medical Record*.

"The author is an experienced writer, an able teacher in his department, and has embodied in the present work the results of a wide field of practical observation. We have not had time to read its pages critically, but freely commend it to all our readers, as one of the most valuable practical works issued from the American press."—*Chicago Medical Examiner*.

BY SAME AUTHOR.

**ON THE UTERUS. The Chronic Inflammation and Displacement of the Unimpregnated Uterus.**

An Enlarged Edition, with Illustrations. 8vo.

Price \$2.50

"A good book from a good man."—*American Journal Medical Science*.

"It is a sensible, practical work, and cannot fail to be read with interest and profit."—*Boston Medical and Surgical Journal*.

**BRAUNE, TOPOGRAPHICAL ANATOMY.**

An Atlas of Topographical Anatomy. Thirty-four Full-page Plates, Photographed on Stone, from Plane Sections of Frozen Bodies, with many other illustrations. By WILHELM BRAUNE, Professor of Anatomy at Leipzig. Translated and Edited by EDWARD BELLAMY, F.R.C.S., Lecturer on Anatomy, Charing Cross Hospital, London. Quarto. Price, Cloth, \$10.00; Half Morocco, \$12.00

"As a whole the work cannot fail to meet with a hearty reception by every progressive student of the human body. To the surgeon it is a contribution to the study of topographical anatomy which needs to be known to be properly appreciated. To such practitioners who reside in large cities, where anatomy can be studied upon the cadaver, it will afford a valuable aid, while to those who are without such means of study it is an almost indispensable addition to a working library."—*New York Medical Record*.

"We commend the book most heartily to the Profession."—*American Journal of Medical Science*.

**BUCKNILL AND TUKE ON INSANITY.**

A Manual of Psychological Medicine: containing the Lunacy Laws, the Nosology, Etiology, Statistics, Description, Diagnosis, Pathology (including morbid Histology), and Treatment of Insanity. By JOHN CHARLES BUCKNILL, M.D., F.R.S., and DANIEL HACK TUKE, M.D., F.R.C.P. Fourth Edition, much enlarged, with twelve lithographic plates, and numerous illustrations. Octavo.

Price \$8.00

"We have read no book in any language, and certainly none in English, which ought to be preferred to this for a text book, by those who wish to make a thorough study of the subject."—*Edinburgh Medical Journal*.

"We can heartily commend the work."—*American Journal of Insanity*.

**BURDETT, HOSPITALS.**

Pay Hospitals and Paying Wards throughout the World. Facts in support of a rearrangement of the system of Medical Relief. By HENRY C. BURDETT. 8vo.

Price \$2.25

"Mr. Burdett displays and discusses the whole scheme of Hospital accommodation with a comprehensive understanding of its nature and extent."—*American Practitioner*.

BY SAME AUTHOR.

**COTTAGE HOSPITALS.**

General, Fever, and Convalescent: their Progress, Management, and Work. Second Edition, rewritten and much Enlarged, with many Plans and Illustrations. Crown 8vo.

Price \$4.50

CONTENTS.—CHAP.—1. Origin and Growth of the Cottage Hospital System. 2. Comparative Success of Treatment in large and small Hospitals. 3. Finance. 4. Cottage Hospital Construction and Sanitary Arrangements. 5. The Medical and Nursing Departments. 6. Domestic Supervision and General Management. 7. Cottage Hospital Appliances and Fittings. 8. Cottage Fever Hospitals. 9. Midwifery in Cottage Hospitals. 10. Remunerative Paying Patients. 11. Convalescent Cottages. 12. Cottage Hospitals in America. 13. Mortuaries. 14. A more Detailed Account of certain Cottage Hospitals, with Plans and Elevations. 15. Selected and Model Plans criticised and compared, with a detailed description of various Hospitals. 16. Peculiarities and Special Features in the Working of Cottage Hospitals. With an Appendix containing much statistical and useful information.

"Mr. Burdett's book contains a mass of information, statistical, financial, architectural, and hygienic, which has already proved of great practical utility to those interested in cottage hospitals, and we can confidently recommend this second edition to all who are in search of the kind of information which it contains."—*Lancet*.

**BUZZARD, SYPHILITIC NERVOUS AFFECTIONS.**

Clinical Aspects of Syphilitic Nervous Affections. By THOS. BUZZARD, M.D. 12mo.

Price \$1.75

**CARPENTER, THE MICROSCOPE. Sixth Edition.**

The Microscope and its Revelations. By W. B. CARPENTER, M.D., F.R.S. Sixth Edition. Revised and Enlarged, with over 500 Illustrations. Price \$5.50

"Not only the student of medicine, but amateurs, and others interested in the study of natural history, will find this volume one of great practical value."—*New York Medical Journal*.

"It is by far the most complete and useful treatise now accessible to the student."—*The Technologist*.

"As a text book of Microscopy in its special relation to natural history and general science, the work before us stands confessedly first, and is alone sufficient to supply the wants of the ordinary student."—*American Journal of Microscopy*.

# Cazeaux's Great Work on Obstetrics.

THE MOST COMPLETE TEXT-BOOK NOW PUBLISHED.  
GREATLY ENLARGED AND IMPROVED.  
CONTAINING 175 ILLUSTRATIONS.

A Theoretical and Practical Treatise on Midwifery, including the Diseases of Pregnancy and Parturition, by P. CAZEAUX, Member of the Imperia Academy of Medicine; Adjunct Professor in the Faculty of Medicine of Paris, etc., etc. Revised and Annotated by S. TARNIER, Adjunct Professor in the Faculty of Medicine of Paris; Former Clinical Chief of the Lying-in-Hospital, etc., etc. Sixth American from the Seventh French Edition. Translated by WM. R. BULLOCK, M. D. In one volume Royal Octavo, of over 1100 pages, with numerous Lithographic and other Illustrations on Wood.

Price, bound in Cloth, bevelled boards,	\$6.00
“ “ Leather,	7.00

M. Cazeaux's Great Work on Obstetrics has become classical in its character, and almost an Encyclopædia in its fulness. Written expressly for the use of students of medicine, and those of midwifery especially, its teachings are plain and explicit, presenting a condensed summary of the leading principles established by the masters of the obstetric art, and such clear, practical directions for the management of the pregnant, parturient, and puerperal states, as have been sanctioned by the most authoritative practitioners, and confirmed by the author's own experience. Collecting his materials from the writings of the entire body of antecedent writers, carefully testing their correctness and value by his own daily experience, and rejecting all such as were falsified by the numerous cases brought under his own immediate observation, he has formed out of them a body of doctrine, and a system of practical rules, which he illustrates and enforces in the clearest and most simple manner possible.

## OPINIONS OF THE PRESS.

"It is unquestionably a work of the highest excellence, rich in information, and perhaps fuller in details than any text-book with which we are acquainted. The author has not merely treated of every question which relates to the business of parturition, but he has done so with judgment and ability." *British and Foreign Medico-Chirurgical Review.*

"The translation of Dr. Bullock is remarkably well done. We can recommend this work to those especially interested in the subjects treated, and can especially recommend the American edition." *Medical Times and Gazette.*

"The edition before us is one of unquestionable excellence. Every portion of it has undergone a thorough revision, and no little modification; while copious and important additions have been made to nearly every part of it. It is well and beautifully illustrated by numerous wood and lithographic engravings, and, in typographical execution, will bear a favorable comparison with other works of the same class."—*American Medical Journal.*

"In the multitudinous collection of works devoted to the propagation of human beings, and to the details of parturition, none, in our estimation, bears any comparison to the work of Cazeaux, in its entire perfectness; and if we were called upon to rely alone on one work on accouchments, our choice would fall upon the book before us without any kind of hesitation."—*West. Jour. of Med. and Surgery.*

"We do not hesitate to say, that it is now the most complete and best treatise on the subject in the English language."—*Buffalo Medical Journal.*

"We know of no work on this all-important branch of our profession that we can recommend to the student or practitioner as a safe guide before this."—*Chicago Medical Journal.*



**CHARTERIS, PRACTICE OF MEDICINE.**

Hand-Book of the Practice of Medicine. By M. CHARTERIS, M.D., Member of Hospital Staff and Professor in University of Glasgow. With Microscopic and other illustrations. Price \$2.00

"We have not often met with a book which can be so confidently recommended to physicians or men in general practice."—*Lancet*.

"The style in which it is written is clear and attractive. The illustrations are a marked feature in it. It can be recommended as a very reliable, handy book, well adapted for ready reference."—*New Remedies*.

**CHAVASSE ON CHILDREN.**

The Mental Culture and Training of Children. By PYE HENRY CHAVASSE. 12mo. Price \$1.00

The mental culture and training of children is of immense importance. Many children are so wretchedly trained, or rather not trained at all, and so mismanaged, that a few thoughts on this subject cannot be thrown away, even upon the most careful.

**CLAY ON OBSTETRIC SURGERY. Third Edition.**

A complete Hand-Book of Obstetric Surgery, with Rules for every Emergency and Descriptions of the more difficult as well as the every day operations. By CHARLES CLAY, M.D., with numerous illustrations. From the Third London Edition. 12mo. Price \$2.00

"It is a useful and convenient book of reference; the illustrations are good, and the book will be found of value to the student and young practitioner, as well as to the skilled Obstetrician."—*American Journal of Obstetrics*.

**CLEVELAND, POCKET DICTIONARY.**

A Pronouncing Medical Lexicon, containing correct Pronunciation and Definition of terms used in medicine and the collateral sciences. By C. H. CLEVELAND, M.D. Twenty-sixth Edition. 16mo.

Price, Cloth, 75 cents; Tucks with Pocket, \$1.00

This is a most convenient size for the pocket, and contains all the principal words in use, together with rules for pronunciation, abbreviations used in prescriptions, list of poisons, their antidotes, etc.

**COHEN, INHALATION. Enlarged Edition.**

Inhalation, its Therapeutics and Practice, including a Description of the Apparatus Employed, etc. By J. SOLIS COHEN, M.D. With cases and Illustrations. A New Enlarged Edition. 8vo. Price \$2.50

"The book has the merit of containing much information that cannot be found elsewhere."—*N. Y. Medical Journal*.

"One of the best treatises we have seen on this subject."—*Medical Times and Gazette*.

BY SAME AUTHOR.

**CROUP,**

In its Relation to Tracheotomy. 8vo.

Price \$1.00

**CLARKE, SURGERY.**

Outlines of Surgery and Surgical Pathology, including the Diagnosis and Treatment of Obscure and Urgent Cases. By F. LEGROSS CLARKE, F.R.S. Second Edition. 8vo. Price \$2.00

**COBBOLD, PARASITES.**

A Treatise on the Entozoa of Man and Animals, including some account of the Ectozoa. By T. SPENCER COBBOLD, M.D., F.R.S. With 85 illustrations. 8vo. Price \$5.00

# DAY ON CHILDREN.

A SECOND EDITION. JUST READY.

The Diseases of Children. A Practical and Systematic Treatise, for Practitioners and Students. By WM. HENRY DAY, M.D. Second Edition. Enlarged. 8vo. 752 pp. Price, Cloth, \$5.00; Sheep, \$6.00

## What Prominent Professors Say of It.

"The more I read Dr. Day's book, the more I like it. I shall recommend it to the students of Georgetown College."—Prof. J. TABER JOHNSON, *Washington, D. C.*

"I pronounce the book a good one, and one that promises to be useful to both practitioners and students."—Prof. W. A. EDMUNDS, *St. Louis.*

"I think it admirably adapted to the uses of practitioners and students of medicine."—Prof. HANNAH T. CROASDALE, *Woman's Medical College, Philadelphia.*

"Believing the work well adapted to meet the wants of the student as well as the practitioner, it will give me pleasure to recommend it to the classes of Rush Medical College."—Prof. DE LESKIE MILLER, *Chicago.*

"It is the work for which we have so long felt the want and need. I take pleasure in recommending it."—Prof. C. T. BEDFORD, *Indianapolis, Ind.*

"The practitioner can confidently rely upon finding in its pages the very best and latest knowledge con-

cerning the diseases of children."—Prof. W. J. COLLIN, *Dayton, O.*

"It is just what a student and a busy practitioner needs. I can heartily recommend it."—Prof. J. M. DUNHAM, *Columbus, O.*

"It is, in my judgment, the most satisfactorily arranged and eminently practical work upon the ailments of infancy and childhood yet published in the English language."—Prof. F. L. SIM, *Memphis, Tenn.*

"It is especially to be recommended for judicious comments on infant feeding, etc."—Prof. H. G. LANDIS, *Columbus, O.*

"An excellent practical treatise, superior to any of the reprints in the department of Diseases of Children that I have seen."—Prof. E. O. F. ROEB, *Chicago.*

"It is fairly entitled to the highest rank among the text-books on Diseases of Children."—Prof. J. B. KINGSLEY, *St. Louis.*

## PRESS OPINIONS.

"A careful examination of this book leads us to characterize it as a plain, straightforward treatise on the subject upon which it treats, . . . giving sound practical advice."—*Philadelphia Medical Times.*

"We heartily recommend this book to the profession as a safe and reliable guide in the department of which it treats."—*Medical and Surgical Reporter.*

"The book is wonderfully readable."—*British Medical Journal.*

"The article on the true diseases of children, those of the pulmonary, circulatory and renal apparatus, and the nervous system, are in many parts exhaustive. . . . The writing is clear and forcible, and to the point."—*American Journal of Medical Sciences.*

"We have no doubt it will be read with interest, which its style, as well as its matter, deserves."—*Dublin Medical Journal.*

"Taking the book as a whole, its correct classification, its perfect style, and its comprehensiveness place it in advance of all other books upon the same subject."—*Walsh's Retrospect.*

"A safe guide for the student and practitioner."—*College and Clinical Record.*

"One of the most useful and valuable additions to the medical literature of the present day. No medical library should be without this book on its shelves."—*Medical Bulletin.*

"Dr. Day brings to his task a large experience, and evidences a very thorough knowledge of the literature, native and foreign, pertaining to this special branch of medicine. The book has been written with great care, and the author is a good writer. The publisher's part of the task has also been excellently performed."—*Boston Medical and Surgical Journal.*

"We advise every physician to have a copy."—*Braithwaite's Quarterly Epitome.*

"Altogether we can heartily commend this volume to any students of this subject that desire to obtain the latest and most judicious compend of our knowledge of Children's Diseases."—*Detroit Lancet.*

"One of the most satisfactory guides in the diagnosis and treatment of diseases peculiar to children to be had in the language."—*New Remedies.*

"This volume, from the title-page to the end of the last chapter, abounds in just such practical and well-put information as every man, in the course of his treatment of children's diseases, must oftentimes feel the need."—*Medical Herald, Louisville.*

"We commend it particularly for its practical worth, being full of valuable hints in regard to diagnosis and treatment."—*Medical Annals, Albany, N. Y.*

"It should be in the library of every medical student and practitioner."—*Southern Medical Record.*

"It is full of valuable facts and suggestions that will make a welcome addition to the working library of every practitioner."—*Ohio Medical Journal.*

"Plain, full and eminently practical."—*Southern Clinic.*

"The book is up to the times, and we cordially commend it to those for whom it is written, but especially the student."—*Therapeutic Gazette.*

"A safe guide in practice."—*Pacific Medical and Surgical Journal.*

"It is not too much to say of it that it is probably not equaled, and certainly not excelled, by any other book on its subject."—*Michigan Medical News.*

"A thoroughly practical work."—*Independent Practitioner.*

"It is just such a book as is wanted by the general practitioner."—*Medical Brief.*

Price: Cloth, \$5.00; Leather, \$6.00. For sale by all booksellers, or sent to any address, postpaid, on receipt of price.



**COULSON, THE BLADDER. Sixth Edition.**

Diseases of the Bladder and Prostate Gland. By WALTER J. COULSON, F.R.C.S. Sixth Edition. Revised and Enlarged, with 22 Engravings. 8vo. Price \$6.40

**CRIPPS, THE RECTUM.**

Cancer of the Rectum. Its Pathology, Diagnosis and Treatment. By W. HARRISON CRIPPS, F.R.C.S. Illustrated by Plates. 8vo. Price \$2.40

**CORMACK. CLINICAL STUDIES.**

Illustrated by Cases Observed in Hospital and Private Practice. By SIR JOHN ROSE CORMACK, M.D., K.B., etc. Illustrated. 2 vols. 1127 pp. Price \$5.00

CONTENTS.—Vol. I.—Chapter I. Relapsing Fever. II. Cholera. III. Scarlatinous Nephritis. IV. Puerperal Convulsions. V. Glandular Degeneration of the Kidney, and Its Relation to Scrofula. VI. Infantile Remittent Fever. VII. Labor Complicated with Cauliflower Excrescence of the Uterus. VIII. Value of the Dark Abdominal Line as a Test of Recent Delivery. IX. Dystocia from Cystous Kidney in the Mature Fœtus. X. Hernia of the Uterus.

Vol. II.—Chapter I. Air in the Organs of Circulation. II. Reflex Convulsions in Infancy. III. Pharyngo-Laryngo-Tracheal Diphtheria. IV. Diphtheria. V. Paralytic Affections. VI. Paralytic Affections in Enteric Fever. VII. Treatment of Paralytic Affections. VIII. Non-Venereal Discharges from the Urethra. IX. Scarlatinal Vaginitis. X. Congenital Syphilis. XI. Chronic Poisoning by Chloroform. XII. Resection of the Shoulder Joint. XIII. Concussion of the Brain. XIV. General Paralysis with Insanity. XV. Short Attacks of Insanity.

**DAY ON HEADACHES.**

The Nature, Causes, and Treatment of Headaches. Third Edition. Illustrated. By WM. HENRY DAY, M.D. Price \$2.00

SUMMARY OF CONTENTS.—Headache from Cerebral Anaemia, Cerebral Hyperæmia, Sympathetic, Congestive, Dyspeptic or Biliary Headaches, Headache from Plethora, from Exhaustion, from Change in Cerebral Tissue, from Affections of the Periosteum, Nervous and Nervo-Hyperæmic Headache, Toxæmic, Rheumatic, Arthritic or Gouty Headache, Neuralgic Headache, and Headaches of Childhood, Early and Advanced Life.

"Well worth reading. The remarks on treatment are very sensible."—*Boston Medical and Surg. Journal.*

**DALBY, ON THE EAR.**

The Diseases and Injuries of the Ear. By W. B. DALBY, M.D., Surgeon and Lecturer on Aural Surgery, St. George's Hospital. With Illustrations. 12mo. Price \$1.50

"A safe and readable introduction to aural surgery." *Medical Press and Circular.*

"Dr. Dalby has presented us with a very readable little book, which is destined to render much service in the saving of ears."—*N. Y. Medical Journal.*

"The lectures occupy 226 pages, are clearly and consistently written, contain a number of good illustrations, and are well worth the careful study of both student and practitioner. To aurists the work will be most welcome and valuable."—*Specialist.*

**DILLINGBERGER, WOMEN AND CHILDREN'S DISEASES.**

A Hand-Book of the Treatment of the Diseases Peculiar to Women and Children. By Dr. EMIL DILLINGBERGER. 12mo. Price \$1.50

"It is a *magnum in parvo*. The style is simple, clear, lucid, and free from theoretical discussion. No one will regret the small outlay for this volume."—*Richmond and Louisville Medical Journal.*

**DUNGLISON, THE PHYSICIAN'S REFERENCE BOOK.**

The Practitioner's Reference Book, containing Therapeutical and Practical Hints, Dietetic Rules, and General Information. By RICHARD J. DUNGLISON, M.D. Second Edition. 8vo. Price \$3.50

"We can heartily commend this book as one that must prove very useful to the general practitioner."—*The Medical Record.*

"The demand for a second edition so soon after the publication of the first volume shows that this work is appreciated by the profession."—*Canada Lancet.*

**DURKEE, VENEREAL DISEASES. Sixth Edition.**

Gonorrhœa and Syphilis. By SILAS DURKEE, M.D. Sixth Edition. Revised and Enlarged, with Portrait and Eight Colored Illustrations. 8vo. Price \$3.50

"We may, finally, recommend Dr. Durkee's book as eminently practical, well written, full of excellent counsel, and worthy of being consulted by every member of the profession. A late number of the *London Medical Times and Gazette* also speaks of the book in terms of the highest approval."—*Boston Medical and Surgical Journal.*

**DAGUENET, OPHTHALMOSCOPY.**

A Manual of Ophthalmoscopy, for the Use of Students. By Dr. DAGUENET. Translated from the French, by Dr. C. S. JEAFFRESON, F.R.C.S.E. Illustrated. 12mo. Price \$1.50

"Its portable size, the condensed nature of its text, and the admirably systematic arrangement of its contents, render it extremely useful as a pocket manual for Students.—*Translator's Preface.*

**DOBELL, WINTER COUGH AND CATARRH.**

On Winter Cough, Catarrh, Bronchitis, Emphysema, Asthma, etc. By HORACE DOBELL, M.D., Lecturer at the Royal Hospital for Diseases of the Chest, Third Edition. With Colored Plates. 8vo. Price \$3.50

BY SAME AUTHOR.

**ON LOSS OF WEIGHT. Revised Edition.**

Blood Spitting and Lung Disease. Colored Frontispiece of Lung. Tabular Map, etc. Second Edition Enlarged. 8vo. Price \$4.00

**DOMVILLE, ON NURSING.**

A Manual for Hospital Nurses and others engaged in attending to the sick. 4th Edition. With Recipes for Sick Room Cookery, etc. Price \$1.00

**DRUITT'S MODERN SURGERY. Eleventh Edition.**

The Surgeon's Vade Mecum; a Manual of Modern Surgery. By ROBERT DRUITT, F.R.C.S. Eleventh Enlarged Edition, with 369 Illustrations. 864 pp. 1878. Price \$5.00

This is a most complete, accurate, and trustworthy Hand, or Text-Book of Surgery. Unrivaled as a book for the Student. Fully illustrated, and brought up to the present state of the science. In use in many Medical Colleges.

**DULLES, ACCIDENTS.**

What to do First, in Accidents and Poisoning. By C. W. DULLES, M.D. Illustrated. 16mo. Price .50

"Its usefulness entitles it to a wide and permanent circulation."—*Boston Gazette.*

"A complete guide for sudden emergencies."—*Philadelphia Ledger.*

"So plain and sensible that it ought to be introduced into every female seminary."—*Evening Chronicle, Pittsburgh.*

**EDWARDS, BRIGHT'S DISEASE. New Edition.**

How a Person Affected with Bright's Disease Ought to Live. By JOS. F. EDWARDS, M.D. Second Edition. 12mo. Price .75

BY SAME AUTHOR.

**DYSPEPSIA. Just Ready.**

How to Avoid It. 12mo. .75

CONTENTS.—CHAP. I.—Food. II. Digestion. III. How to Cook Food. IV. How and What We Ought to Eat.

**CONSTIPATION. New Edition.**

Plainly Treated and Relieved Without the Use of Drugs. Second Edition. 12mo. Price .75

**MALARIA.**

Malaria: What It Means; How to Escape It; Its Symptoms; When and Where to Look for It. 12mo. Price .75

These are, invaluable little treatises upon subjects that enter painfully into the life experiences of a large majority of the human family. Dr. Edwards shows not only how they may be avoided, but in plain and simple language he tells those already afflicted with them how they may find relief. Many learned works have been written upon their treatment; but the authors have, in nearly every case, neglected to show to the public how to avoid them.

**EKIN, WATER ANALYSIS.**

Potable Water. How to Form a Judgment on the Suitableness of Water for Drinking Purposes. By CHARLES EKIN. Second Edition. 12mo. Price .75

**ELLIS, DISEASES OF CHILDREN.**

A Practical Manual of the Diseases of Children, with a Formulary. By EDWARD ELLIS, M.D. Late Physician to the Victoria Hospital for Children, London. Fourth Edition Enlarged. Now Ready. Price \$3.50

BY SAME AUTHOR.

**WHAT EVERY MOTHER SHOULD KNOW.**

12mo.

Price .75

"It is only too true that our children have to dodge through the early part of life as through a labyrinth. We must be thankful to meet with such a sensible guide for them as Dr. Ellis."—*Pall-Mall Gazette*.

**FENNER, ON VISION.**

Vision; Its Optical Defects, the Adaptation of Spectacles, Defects of Accommodation, etc. By C. S. FENNER, M.D. With Test Types and 74 Illustrations. 8vo. Price \$3.50

**FENWICK, THE PRACTICE OF MEDICINE.**

Outlines of the Practice of Medicine. With Appropriate Formulæ and Illustrations. By SAMUEL FENWICK, M.D., Physician to the London Hospital. 12mo. Price \$2.00

"This little work displays a sound judgment in the arrangement of its subject matter, and an intimate acquaintance with the practice of medicine possessed by but few writers, and should have been elaborated into a more comprehensive work. Of all the hand-books we have seen, this is certainly one of the best."—*Medical Herald*.

"It is an eminently practical little treatise, pervaded with much common sense, and will doubtless be found useful, particularly by advanced students."—*Boston Medical and Surgical Journal*.

BY SAME AUTHOR.

**ON THE STOMACH.**

The Morbid State of the Stomach and Duodenum, and Their Relations to Diseases of Other Organs. With 10 Plates. 8vo. Price \$4.25

Atrophy of the Stomach and Its Effect on the Nervous Affections of the Digestive Organs. 8vo. Price \$3.20

**FOTHERGILL, ON THE HEART. Second Edition.**

The Heart and Its Diseases. With Their Treatment. Including the Gouty Heart. By J. MILNER FOTHERGILL, M.D., Associate Fellow of the College of Physicians of Philadelphia. Second Edition, Entirely Re-written. Octavo. Price \$3.50

"It is the best, as well as the most recent work on the subject in the English language."—*Medical Press and Circular*.

"The most interesting chapter is undoubtedly that on the gouty heart, a subject which Dr. Fothergill has specially studied, and on which he entertains views such as are likely, we think, to be generally accepted by clinical physicians, although they have not before been stated, so far as we are aware, with the same breadth of view and extended illustration."—*British Medical Journal*.

"To many an earnest student it will prove a light in darkness; to many a practitioner cast down with a sense of his powerlessness to cope with the rout and demoralization of Nature's forces, a present help in time of trouble."—*Philadelphia Medical Times*.

"The work throughout is a masterpiece of graphic, lucid writing, full of good, sound teaching, which will be appreciated alike by the practitioner and the student."—*Students' Journal*.

**FULTON, ON PHYSIOLOGY.**

A Text-Book of Physiology. By J. FULTON, M.D., Professor at Trinity Medical College, Toronto. Second Edition, Illustrated and Revised. 8vo. Price \$4.00



## FLOWER, DIAGRAMS OF THE NERVES.

Diagrams of the Nerves of the Human Body. Exhibiting their Origin, Divisions, and Connections, with their Distribution to the various Regions of the Cutaneous Surface, and to all the Muscles. By WILLIAM H. FLOWER, F.R.C.S., F.R.S., Hunterian Professor of Comparative Anatomy, and Conservator of the Museum of the Royal College of Surgeons. Third Edition, thoroughly revised. With six Large Folio Maps, or Diagrams. Royal Quarto. Price \$3.50

"Admirably arranged, and will be of incalculable aid to the student of anatomy. Each of the large and beautiful plates is accompanied with explanatory text."—*N. Y. Medical Record*.

"The nerves and ganglia are clearly represented. The impressions are well made, and no doubt the diagrams will prove useful."—*Medical and Surgical Reporter*.

## FLAGG, PLASTIC FILLING.

Plastics and Plastic Filling; As Pertaining to the Filling of all Cavities of Decay in Teeth below Medium in Structure, and to Difficult and Inaccessible Cavities in Teeth of all Grades of Structure. With some beautifully executed Illustrations. By J. FOSTER FLAGG, D.D.S., Professor of Dental Pathology and Therapeutics in Philadelphia Dental College. Octavo. Price \$3.00

CONTENTS.—Introductory. Article 1. Plastic Filling. 2. Amalgam. 3. Amalgam continued. 4. Amalgam continued. 5. Attributes of Metals used for Amalgam Alloys. 6. The Making of Amalgam Alloys. 7. Tests for Amalgam. 8. Preparation of Cavities. 9. The Making of Amalgam. 10. Instrument for the Insertion of Amalgam Fillings. 11. The Insertion of Amalgam Fillings. 12. General Considerations Pertaining to Amalgam. 13. Gutta-percha. 14. Oxy-chloride of Zinc. 15. Oxy-sulphate of Zinc. 16. Zinc Phosphate. 17. Temporary Stopping. 18. Technicalities. Conclusion.

## FOSTER, CLINICAL MEDICINE.

Lectures and Essays on Clinical Medicine. By BALTHAZAR FOSTER, M.D. Illustrated. 8vo. Price \$3.00

"No one can peruse the thoughtful comments of our author upon every subject he considers, without feeling himself a wiser man for his pains."—*N. Y. Medical Journal*.

"It is the record of honest work, such as Dr. Foster may be proud of; we can recommend it to the profession; it may be read with profit and advantage by both practitioner and student."—*Edinburgh Medical Journal*.

## FOX, ATLAS OF SKIN DISEASES.

Complete in Eighteen Parts, each containing Four Chromo-Lithographic Plates, with Descriptive Text and Notes upon Treatment. In all 72 large colored Plates. By TILBURY FOX, M.D., F.R.C.P., Physician to the Department for Skin Diseases in University College Hospital. Folio Size. Price \$2.00 each, or complete, bound in cloth, \$30.00

No Atlas of Skin Diseases has been issued in this country for many years, and no complete work of the kind is now procurable by the Profession. This one, brought out under the editorial supervision and care of Dr. Tilbury Fox (the most distinguished writer on Cutaneous Medicine now in the English language), is partly based upon the classical work of Willan and Bateman (now entirely out of print), but completely remodeled, so as to represent fully the Dermatology of the present day.

"Preference will be given to this work over Hebra; not simply, however, because it is a home production, but by reason of the manner of its execution, the excellent delineation of disease, and the natural coloring of the plates. The letter-press is entirely new. In the accuracy of the latter the subscriber may have the fullest confidence, since it is from the pen of Dr. Tilbury Fox."—*British and Foreign Medico-Chirurgical Review*.

## FRANKLAND, WATER ANALYSIS.

Water Analysis, For Sanitary Purposes, with Hints for the Interpretation of Results. By E. FRANKLAND, M.D., F.R.S. Illustrated. 12mo. Price \$1.00

"The author's world-wide reputation will commend this manual to all sanitarians, and they will not be disappointed in finding all the essentials of the important subject of which it treats."—*The Sanitarian*.

"The work is one which physicians practicing in the country and in villages and towns remote from medical centres cannot afford to be without."—*Medical and Surgical Reporter*.

BY SAME AUTHOR.

## CHEMISTRY.

How to Teach Chemistry; being Six Lectures to Science Teachers. Edited by G. GEORGE CHALONER, F.C.S. Illustrated. 12mo. Price \$1.25

**FOX, WATER, AIR AND FOOD.**

Sanitary Examinations of Water, Air and Food. By CORNELIUS B. FOX, M.D. 94 Engravings. 8vo. Price \$4.00

**GALLABIN, DISEASES OF WOMEN.**

The Student's Guide to the Diseases of Women. By A. LEWIS GALLABIN, M.A., M.D., F.R.C.P. Illustrated with 63 Engravings. 12mo. Price \$2.00

"Among all the various works on diseases of women with which we are acquainted, there is none which so nearly approaches the perfection of what a student's text-book should be. . . . The work is well illustrated."  
—*Students' Journal*.

"Though the book is a small one and the subject extensive, yet so admirable is the style of the writer, and so careful his selection of words, that each disease is thoroughly treated of."—*Philadelphia Medical Times*.

"Its style is clear, elegant, and concise. It contains a great amount of information; indeed, we do not think the student or practitioner will find any book which will convey to him in so small a compass so much accurate knowledge about the pathology and diagnosis of the diseases peculiar to women."—*Medical Times and Gazette*.

**GROSS, BIOGRAPHY OF JOHN HUNTER.**

John Hunter and His Pupils. By S. D. GROSS, M.D., Professor of Surgery in Jefferson Medical College, Philadelphia. With a beautifully executed full length Portrait of the Author in his Study. A Handsome Octavo volume. Bound in Beveled Cloth. Price \$1.50

"It is refreshing to read the story of a life so fully devoted to science, and the reader will readily appreciate Professor Gross's enthusiasm for his subject, which led him to extend what was originally intended for an essay to its present size.

"The prototype of Sharp's well-known engraving of Sir Joshua Reynold's portrait is an excellent reproduction, and forms a fitting and handsome frontispiece.

"The volume will prove an ornament to the study table, where it will be a constant incentive to whatever is best and noblest in a noble profession."—*Boston Med. and Surgical Journal*.

BY SAME AUTHOR.

**AMERICAN MEDICAL MEN.**

American Medical Biography of the Nineteenth Century, with portrait of Dr. Benjamin Rush. Large 8vo. Price \$3.50

**GANT, A SYSTEM OF SURGERY. Enlarged Edition.**

The Science and Practice of Surgery, including Special Chapters by different Authors. By FREDERICK JAMES GANT, F.R.C.S., Senior Surgeon to the Royal Free Hospital. Second Edition, rewritten and much enlarged throughout. Illustrated by 969 wood engravings. In two Octavo volumes. Price, Cloth \$11.00; Leather \$13.00

"After the most patient analysis our limited time has permitted, we feel compelled to say that this book is a valuable and comprehensive addition to the surgical literature of the profession and a monument to the careful, conscientious and painstaking industry of the author."—*Cincinnati Lancet and Observer*.

"This new and magnificent work on surgery supplies all that can be required, whether for the most complete study or for constant reference in practice."—*London Medical Press and Circular*.

"The reader has the advantage of mature experience in treating of special subjects, that are either omitted or very lightly referred to in ordinary works on surgery."—*London Lancet*.

BY SAME AUTHOR.

**ON THE BLADDER AND PROSTATE.**

Diseases of the Bladder and Prostate Gland and Urethra, including a Practical View of Urinary Diseases, Deposits and Calculi. Fourth Edition, Revised and Enlarged, with New Illustrations. 12mo. Price \$3.00

**GIBBES, STUDENT'S PATHOLOGY.**

Practical Histology and Pathology. By HENEAGE GIBBES, M.B. 12mo. Cloth. Price \$1.00

CHAP. I. Introduction. 2. On Preparing Tissues for Examination. 3. On Cutting Sections. 4. On Staining. 5. On Double Staining. 6. On Mounting. 7. Method of Obtaining Animal Tissues, etc. Practical Histology, Pathology, Memoranda and Formulae.

"This excellent little work is admirably adapted to fulfill the purpose for which it has been written. It is short, clear, and eminently practical. The author is evidently an accomplished histologist, and his book conveys the impression that it is based upon his own personal experience."—*The London Medical Record*.

**GODLEE'S ATLAS OF HUMAN ANATOMY.**

Illustrating most of the Ordinary Dissections and many not usually practiced by the Student. Accompanied by References and an Explanatory Text. Complete. Folio Size. 48 Colored Plates. By RICKMAN JOHN GODLEE, M.D., F.R.C.S. Forming a large Folio Volume, with References, and an Octavo Volume of Letter-press.

Price of the two Volumes, Atlas and Letter-press, Cloth, \$30.00

"It is likely to prove as useful to the physician and surgeon as to the anatomist."—*Medical Times and Gazette.*

"The explanatory text is concise, well written, and contains many valuable suggestions for the surgeon."—*London Lancet.*

**GOWERS, SPINAL CORD.**

Diagnosis of Diseases of the Spinal Cord. With Colored Plates and Engravings. A Second Edition, Revised and Enlarged. By WILLIAM R. GOWERS, M.D., Assistant Professor Clinical Medicine, University College, London. 8vo.

Price \$1.50

BY SAME AUTHOR.

**OPHTHALMOSCOPY.**

A Manual and Atlas of Medical Ophthalmoscopy. With 16 Colored Auto-type and Lithographic Plates and 26 Wood Cuts, comprising 112 Original Illustrations of the Changes in the Eye in Diseases of the Brain, Kidneys, etc. 8vo.

Price \$6.00

**GREENHOW, BRONCHITIS.**

On Chronic Bronchitis, especially as connected with Gout, Emphysema, and Diseases of the Heart. By E. HEADLAM GREENHOW, M.D. 12mo. Price \$1.50

BY SAME AUTHOR.

**ADDISON'S DISEASE.**

Being the Croonian Lectures, delivered before the Royal College of Physicians, London. Revised and Illustrated by Plates and Reports of Cases. 8vo.

Price \$3.00

"The book forms a most interesting and valuable monograph, comprehensive and exhaustive."—*British Medical Journal.*

**GLISAN, TEXT-BOOK OF MODERN MIDWIFERY.**

A Text-Book of Modern Midwifery. By RODNEY GLISAN, M.D., Emeritus Professor of Midwifery and Diseases of Women and Children in the Medical Department of Willamette University, Portland, Oregon, and Late President of the Oregon State Medical Society. With 129 Illustrations. One Volume, octavo, 624 pp.

Price, in Cloth \$4.00; in Leather \$5.00

Many years have elapsed since the appearance of an original American text-book of obstetrics. The author of this one, believing that there is a demand for a work thoroughly representing American obstetrical practice, ventures to present this condensed treatise to the medical students and practitioners of his own country. Many years' experience as a practitioner and several as a teacher of midwifery, warrants this effort to supply the demand for a book fully brought up to the present time, faithfully representing the peculiarities of American practice, and adapted to the wants of obstetric teachers and busy practitioners.

The book is freely illustrated wherever its value and usefulness can be thus enhanced, and being brought out—owing to the unavoidable absence of the author—under the supervision of the well-known obstetrician, Dr. Robert P. Harris, of Philadelphia, the publishers very confidently anticipate for it a favorable reception.

**GILL, ON INDIGESTION. Second Edition.**

Indigestion; What It Is; What It Leads To; and a New Method of Treating It. By JOHN BEADNELL GILL, M.D. Second Edition. 12mo. Price \$1.25



**HABERSHON, ON THE STOMACH.**

On Diseases of the Stomach—The Varieties of Dyspepsia—Their Diagnosis and Treatment. By S. O. HABERSHON, M.D., F.R.C.P., Senior Physician to, and Late Lecturer on, the Principles and Practice of Medicine at Guy's Hospital. Third Edition, Revised. Crown 8vo. Price \$1.75

"As an expression of the results of long personal experience in both hospital and private practice, conveyed in agreeable though not always perspicuous diction, this contribution of Dr. Habershon's has special value of its own, and is so far entitled to the favorable consideration of the practitioner, as is already testified by a demand for a third edition."—*American Journal of Medical Sciences*.

"It is divided into twenty chapters, fifteen of which are devoted to a consideration of the different forms of Dyspepsia, while the remaining treat of Degeneration, Ulceration, Cancerous Diseases, and Spasms of the Stomach." We can cordially recommend this book of Dr. Habershon's to the profession."—*Medical Record*.

**HALE, ON CHILDREN.**

The Management of Children in Health and Disease. A Book for Mothers. By MRS. AMIE M. HALE, M.D. Abounding in valuable information and common-sense advice. New Enlarged Edition. 12mo. Price .75

"We shall use our influence in the introduction of this work to families under our care, and we urge the profession generally to follow our example."—*Buffalo Medical and Surgical Journal*.

**HARDWICH AND DAWSON, PHOTOGRAPHIC CHEMISTRY.**

Hardwich's Manual of Photographic Chemistry. Illustrated. Eighth Edition. Rearranged by G. DAWSON. 12mo. Price \$2.00

**HARDWICKE, MEDICAL EDUCATION.**

Medical Education and Practice in All Parts of the World. Containing Regulations for Graduation at the Various Universities throughout the World. By HERBERT JUNIUS HARDWICKE, M.D., M.R.C.P. 8vo. Price \$3.00

"Dr. Hardwicke's book will prove a valuable source of information to those who may desire to know the conditions upon which medical practice is or may be pursued in any or every country of the world, even to the remotest corners of the earth. The work has been compiled with great care, and must have required a vast amount of labor and perseverance on the part of its author."—*Dublin Medical Journal*.

**HARRISON, STRICTURE OF THE URETHRA.**

On Stricture and Other Diseases of the Urinary Organs. By RENEGALL HARRISON, F.R.C.S. With numerous Illustrations. 8vo. Price \$2.75

**HAYDEN, ON THE HEART.**

The Diseases of the Heart and Aorta. By THOMAS HAYDEN, M.D. With 81 Illustrations. 2 vols. 1232 pp. 8vo. Price \$6.00

"The author evidently has had a very wide and well used experience in that of which he writes; is well versed in modern physiology and pathology, and holds a fluent pen, consequently the book is an excellent one, and as the teachings of the text are abundantly illustrated by the reports of one hundred and fifty cases, Dr. Hayden's effort will probably attain the popularity it deserves."—*Philadelphia Medical Times*.

"There is not an unnecessary page in Dr. Hayden's work."—*N. Y. Medical Record*.

**HOLDEN, HUMAN OSTEOLOGY. Sixth Edition.**

Comprising a Description of the Bones, with Colored Delineations of the Attachments of the Muscles. The General and Microscopical Structure of Bone and its Development. By the Author and A. DORAN, F.R.C.S., with Lithographic Plates, etc. By LUTHER HOLDEN, F.R.C.S. Numerous Illustrations. Sixth Edition, carefully Revised. Price \$5.50

BY SAME AUTHOR.

**ANATOMY.**

Manual of Dissections of the Human Body. Fourth London Edition. With 170 Illustrations. Price \$5.50

**LANDMARKS.**

Landmarks, Medical and Surgical. Third London Edition. Revised and Enlarged. Price \$1.25

"Mr. Holden is the happy possessor of the faculty of writing interesting works on Anatomy. A part of the charm consists in the frequent references to practical points, and in the explanation of the advantages and objects of details of structures."—*Boston Medical and Surgical Journal*.

**HEATH'S OPERATIVE SURGERY.**

A Course of Operative Surgery, consisting of a Series of Plates, each plate containing Numerous Figures, Drawn from Nature by the Celebrated Anatomical Artist, M. Lévillé, of Paris, Engraved on Steel and Colored by Hand, under his immediate superintendence, with Descriptive Text of Each Operation. By CHRISTOPHER HEATH, F.R.C.S., Surgeon to University College Hospital, and Holme Professor of Clinical Surgery in University College, London. One Large Quarto Volume. Price \$14.00

The author has embodied in this work the experience gained by him during twenty years of surgical teaching. It comprises all the operations that are required in ordinary surgical practice. He has selected for illustration and description those methods which appear to give the best results in practice, referring to the errors likely to occur and the best methods of avoiding them.

BY SAME AUTHOR.

**THE STUDENT'S GUIDE TO SURGICAL DIAGNOSIS.**

12mo.

Price \$1.50

"Mr. Heath is so well known, both as a practical surgeon, teacher and writer, that anything from his pen requires no introduction from the hands of reviewers, and scarcely any notice but the announcement of the fact that he has written a book."—*Medical Record*.

**A MANUAL OF MINOR SURGERY AND BANDAGING.**

Sixth Edition, Revised and Enlarged. With 115 Illustrations. 12mo.

Price \$2.00

"This excellent work should not be termed a 'Minor' Surgery, but it really consists of the sum and substance of Practical surgery. We would not exchange it for any book in our possession."—*Southern Clinic*.

**HEATH'S PRACTICAL ANATOMY. Fifth London Edition.**

Practical Anatomy. A Manual of Dissections. Fifth London Edition. 24 Colored Plates, and nearly 300 other Illustrations. Just Ready. Price \$5.00

**INJURIES AND DISEASES OF THE JAWS.**

The Jacksonian Prize Essay of the Royal College of Surgeons of England, 1867. Second Edition, Revised, with over 150 Illustrations. Octavo.

Price \$4.25

**HOOD, ON GOUT AND RHEUMATISM.**

A Treatise on Gout, Rheumatism, and the Allied Affections. Their Treatment, Complications, and Prevention. By PETER HOOD, M.D. Second Edition, Revised and Enlarged. With some Considerations on Longevity. Octavo.

Price \$3.50

"The Observations on Treatment are specially to be commended."—*London Lancet*.

**HOLDEN, THE SPHYGMOGRAPH.**

The Sphygmograph. Its Physiological and Pathological Indications. By EDGAR HOLDEN, M.D. Illustrated by Three Hundred Engravings on Wood. 8vo.

Price \$2.00

**HOLMES, THE LARYNGOSCOPE.**

A Guide to the Use of the Laryngoscope in General Practice. By GORDON HOLMES, M.D., Physician to the Throat and Ear Infirmary. 12mo.

Price \$1.00

BY SAME AUTHOR.

**VOCAL PHYSIOLOGY.**

Vocal Physiology and Hygiene. With reference to the Cultivation and Preservation of the Voice. Illustrated. 12mo.

Price \$2.00

**HOFF, ON HÆMATURIA.**

Hæmaturia as a Symptom of the Diseases of the Genito-Urinary Organs. By O. HOFF, M.D. Illustrated. 12mo.

Price .75



**HUNTER, MECHANICAL DENTISTRY.**

A Practical Treatise on the Construction of the Various kinds of Artificial Dentures, with Formulæ, Receipts, etc. By CHARLES HUNTER, D.D.S. 100 Illustrations. 12mo. Price \$2.25

"It is the outcome of his own experience of some twenty years as a Mechanical Dentist, and contains, moreover, much derived from practical knowledge of other dentists. The value of the book is also much added to by illustrations. It will be very useful to the Dental Student, and to all Mechanical Dentists."—*London Medical Times and Gazette*.

**HUTCHINSON'S ILLUSTRATIONS OF CLINICAL SURGERY. First Volume Complete.**

Consisting of Plates, Photographs, Woodcuts, Diagrams, etc. Illustrating Surgical Diseases, Symptoms, and Accidents; also Operations and other Methods of Treatment. With Descriptive Letter-press. By JONATHAN HUTCHINSON, F.R.C.S., Senior Surgeon to the London Hospital, Surgeon to the Moorfields Ophthalmic Hospital, and to the Hospital for Diseases of the Skin, Blackfriars. In Quarterly Fasciculi. Imperial 4to. Volume 1. (Ten Fasciculi) bound complete in itself. Price \$25.00. Parts Eleven, Twelve, Thirteen, and Fourteen of Volume 2, Now Ready. Each \$2.50

**HEWITT, DISEASES OF WOMEN. Third Edition.**

The Diagnosis, Pathology, and Treatment of Diseases of Women, Including the Diagnosis of Pregnancy. Founded on a Course of Lectures Delivered at St. Mary's Hospital Medical School. By GRAILY HEWITT, M.D., Lond., M.R.C.P., Physician to the British Lying-in Hospital; Lecturer on Midwifery and Diseases of Women and Children at St. Mary's Hospital Medical School; Honorary Secretary to the Obstetrical Society of London, etc. The Third Edition. Revised and Enlarged, with New Illustrations. Octavo.

Price, Cloth \$4.00; Leather \$5.00

"Readers of the former editions will not require to be told that the additions now made are of the highest possible excellence."—*Times and Gazette*.

"It is one of the most useful, practical, and comprehensive works upon the subject in the English language, a true guide to the student, and an invaluable means of reference for the teacher."—*N. Y. Medical Record*.

"The excellent work of Dr. Hewitt presents—in a form well adapted to conduct the student to a knowledge of the Diseases of Women, and to assist the young practitioner in his study of these diseases at the bedside of the patient—a very full and clear exposition of the views entertained by the most authoritative teachers as to their pathological treatment and their correct Diagnosis."—*Amer. Med. Journal*.

**HAY, SARCOMATOUS TUMOR.**

History of a Case of Recurring Sarcomatous Tumor of the Orbit in a Child. By THOMAS HAY, M.D. Illustrated. Paper. Price .50

**HEWSON, EARTH IN SURGERY.**

Earth as a Topical Application in Surgery, Being a Full Exposition of its Use in Cases Requiring Topical Applications. By ADDINELL HEWSON, M.D. Illustrated. 8vo. Price \$2.50

**HODGE, ON ABORTION.**

On Foeticide or Criminal Abortion. By HUGH L. HODGE, M.D.

Price, Paper, .30; Cloth, .50

**HODGE, CASE-BOOK.**

Note-Book for Cases of Ovarian Tumors. By H. LENNOX HODGE, M.D. With Diagrams. Price, Paper, .50

**HIGGINS, DISEASES OF THE EYE.**

A Hand-Book of Ophthalmic Practice. By CHARLES HIGGINS, F.R.C.S. Ophthalmic Assistant Surgeon at Guy's Hospital. Second Edition. 16mo. Price .60

CONTENTS.—SECTION I. Discharge from the Eyes. II. Intolerance of Light. III. Iritis and Glaucoma. IV. Diseases of the Eyelids. V. Waterying of the Eye. VI. Acuteness of Vision, Field of Vision, Anomalies of Refraction, Astigmatism, Accommodation, Presbyopia. VII. Disturbance of Vision, Use of the Ophthalmoscope, Normal and Morbid Appearances. VIII. Injuries.

"We have rarely seen so much important information condensed in so short a space."—*American Medical Journal*.

**HARRIS, THE PRACTICE OF DENTISTRY. Tenth Edition.**

The Principles and Practice of Dentistry. Tenth Revised Edition. In great part Rewritten, Rearranged, and with many new and important Illustrations. By CHAPIN A. HARRIS, M.D., D.D.S. Edited by P. H. AUSTEN, M.D., Professor of Dental Science and Mechanism in the Baltimore College of Dental Surgery. With nearly 400 Illustrations. Royal Octavo. Price, Cloth, \$6.50; Leather, \$7.50

This new edition of Dr. Harris' work has been thoroughly revised in all its parts, more so than any previous edition. So great have been the advances in many branches of dentistry that it was found necessary to rewrite the articles or subjects, and this has been done in the most efficient manner by Professor Austen, for many years an associate and friend of Dr. Harris, assisted by Professor Gorgas and Thomas S. Latimer, M.D. The publishers feel assured that it will now be found the most complete text-book for the student, and guide for the practitioner in the English language.

BY SAME AUTHOR.

**MEDICAL AND DENTAL DICTIONARY. Fourth Edition.**

A Dictionary of Medical Terminology, Dental Surgery, and the Collateral Sciences. Fourth Edition, Carefully Revised and Enlarged. By FERDINAND J. S. GORGAS, M.D., D.D.S., Professor of Dental Surgery in the Baltimore College, etc. Royal Octavo. Price, Cloth, \$6.50; Leather, \$7.50

This Dictionary, having passed through *three* editions, and been for some time out of print, has been again carefully revised by F. J. S. Gorgas, M.D., Dr. Harris' successor as Professor of Dental Surgery in the Baltimore College of Dental Surgery. In his preface to this new edition, the editor says:—

“The object of the reviser has been to bring the book thoroughly up to the present requirements of the profession, the *Medical* portion having been as carefully revised and added to as that devoted more especially to *Dental Science*, while a number of obsolete terms and methods have been omitted. In nearly every one of the seven hundred and forty-three pages of the former edition corrections and additions have been made, and many new processes, terms and appliances described, some of which are not found in any other work published.”

**HANDY, ANATOMY.**

Text-Book of Anatomy and Guide to Dissections. For the Use of Students. By W. R. HANDY, M.D. 312 Illustrations. Price \$3.00

**HILLIER, DISEASES OF CHILDREN.**

A Clinical Treatise on the Diseases of Children. By THOMAS HILLIER, M.D. 8vo. Price \$2.00

**HUFELAND, LONG LIFE.**

The Art of Prolonging Life. By C. W. HUFELAND. Edited by ERASMUS WILSON, M.D. 12mo. Price \$1.00

“We wish all doctors and all their intelligent clients would read it, for surely its perusal would be attended with pleasure and benefit.”—*American Practitioner*.

“It certainly should be in the library of every physician.”—*Medical Brief*.

**HUNTER, PORTRAIT OF.**

Portrait of John Hunter. From Sharp's well-known Engraving; a copy of Sir Joshua Reynold's Portrait. For Framing. Large size, 9 x 11; sheet 16 x 20. Price, in the Sheet, sent free by mail, 50 cents; or, Handsomely Framed, Price \$2.00

**HEADLAND, THE ACTION OF MEDICINES. Sixth Edition.**

On the Action of Medicines in the System. By F. W. HEADLAND, M.D.  
Sixth American Edition, Revised and Enlarged. 8vo. Price \$3.00

"It displays in every page the evidence of extensive knowledge and of sound reasoning; it will be useful alike to those who are just commencing their studies, and to those who are engaged in the active pursuits of professional life."—*Medical Times*.

"The very favorable opinion which we were amongst the first to pronounce upon this essay has been fully confirmed by the general voice of the profession, and Dr. Headland may now be congratulated on having produced a treatise which has been weighed in the balance, and found worthy of being ranked with our standard medical works."—*London Lancet*.

**JAMES, SORE THROAT.**

On Sore Throat, Its Nature, Varieties and Treatment, Including its Connection with other Diseases. By PROSSER JAMES, M.R.C.P. Fourth Edition, Revised and Enlarged. With Colored Plates and Numerous Wood-cuts. 12mo. Price \$2.25.

"We can confidently recommend his therapeutic teachings as well worthy of the careful consideration of the Profession, for they set forth the practice of an enthusiastic worker, whose special experience has been large and lengthened."—*British Medical Journal*.

"The practitioner who buys Dr. James' unpretending little book will provide himself with a wise and practical clinical commentary, and with a well arranged digest of long and varied experience."—*Westminster Review*.

BY SAME AUTHOR.

**LARYNGOSCOPY AND RHINOSCOPY.**

Including the Diagnosis of Diseases of the Throat and Nose. Third Edition. With Colored Plates. 18mo. Price \$2.00.

"It gives in a succinct form the approved methods of examination and treatment of diseases of the nose, throat, and larynx. The plan pursued is one well adapted to the needs of the general practitioner."—*American Medical Journal*.

**JONES, AURAL ATLAS.**

An Atlas of Diseases of the Membrana Tympani. Being a Series of Colored Plates, containing 62 Figures. With appropriate Letter-press and Explanatory Text. By H. MACNAUGHTON JONES, M.D., Surgeon to the Cork Ophthalmic and Aural Hospital. 4to. Price \$6.00.

"The cases are well selected, the drawings executed from life, highly artistic and very conscientious, and the commentaries indicate familiarity with the subject and good judgment in dealing with it."—*British Medical Journal*.

BY SAME AUTHOR.

**AURAL SURGERY.**

A Practical Hand-Book on Aural Surgery. Illustrated. 12mo. Price \$1.50.

**JONES, SIEVEKING AND PAYNE, PATHOLOGICAL ANATOMY.**

A Manual of Pathological Anatomy. By C. HANDFIELD JONES, M.D., and EDWARD H. SIEVEKING, M.D., Physician to St. Mary's Hospital. A New Enlarged Edition. Edited by J. F. PAYNE, M.D., Lecturer on Morbid Anatomy at St. Thomas' Hospital. With Numerous Illustrations. Demi 8vo. Price \$5.50.

**JONES, ON SIGHT AND HEARING.**

The Defects of Sight and Hearing, their Nature, Causes, and Prevention. By T. WHARTON JONES, M.D. Second Edition. 16mo. Price .50.

**KIRBY, ON PHOSPHORUS. Fifth Edition.**

Phosphorus as a Remedy for Functional Diseases of the Nervous System. By E. A. KIRBY, M.D. Fifth Edition. 8vo. Price \$1.00

**KOLLMAYER, KEY TO CHEMISTRY.**

Chemia Coartata, or Key to Modern Chemistry. By A. H. KOLLMAYER, M.D. With Numerous Tables, Tests, etc. Price \$2.25

**KIRKE, PHYSIOLOGY. Revised up to 1881.**

A Hand-book of Physiology. By KIRKE. Tenth London Edition. By W. MORRANT BAKER, M.D. 420 Illustrations. Price \$5.00



**KANE, THE OPIUM, MORPHINE AND SIMILAR HABITS.**

Drugs that Enslave. The Opium, Morphine, Chloral, Hashisch and Similar Habits. By H. H. KANE, M.D., of New York. With Illustrations. Price \$1.50.

"It contains a large amount of information collected with much labor and presented in a systematic manner. The subject of the chloral habit has not been investigated by any one, we believe, so thoroughly as by Dr. Kane."—*Medical Record*.

"It deserves to be read by those who feel an interest in discouraging the use of these dangerous drugs. The book is embellished by an excellent phototype frontispiece of Laocoön."—*American Journal of Pharmacy*.

"A work of more than ordinary ability and careful research. . . . For the first time, reliable statistics on the use of chloral are classified and published, . . . and it is shown that the use of chloral causes a more complete and rapid ruin of mind and body than either opium or morphine."—*Druggists' Circular and Gazette*.

**KIDD, THERAPEUTICS.**

The Laws of Therapeutics; or, the Science and Art of Medicine. By JOSEPH KIDD, M.D. 12mo. Cloth. Price \$1.25.

Dr. Joseph Kidd, who, by the way, was Lord Beaconsfield's medical adviser, and an eminent physician of the regular school, briefly but clearly sketches the history of medicine from the earliest period. He shows that the chief mistakes have been made through deference to theory and negligence of the teachings of facts. Thence he passes to an assertion of the value of the homœopathic principle of *similia similibus* in the treatment of many diseases. He is not a follower of Hahnemann, and does not believe in infinitesimal doses, but he claims, and enforces his position by the citation of cases in his own practice, that the homœopathic principle has performed wonders where that of his own school was much less successful.

"Dr. Kidd acknowledges two laws—that of *contraria contrariis* and *similia similibus*; but the cases he gives in his chapter on *ars medica* show that, like a sensible practitioner, he does not allow himself blindly to follow either the one or the other, but seeks out the cause of disease, and tries by rational measures to remove it. The cases are the most valuable part of the book."—*London Practitioner*.

**LEGG, ON THE URINE.**

Practical Guide to the Examination of the Urine, for Practitioner and Student. By J. WICKHAM LEGG, M.D. Fifth Edition, Enlarged. Illustrated. 12mo. Price .75

This little work is intended to supply the Physician or Student with a concise guide to the recognition of the different characteristics of the urine, and though small and well adapted to the pocket, contains, probably, everything that could be gleaned from a larger work.

**LEARED, IMPERFECT DIGESTION.**

The Causes and Treatment of Imperfect Digestion. By ARTHUR LEARED, M.D. The Sixth Edition. Revised and Enlarged. 12mo. Price \$1.50

**LIEBREICH, ATLAS OF OPHTHALMOSCOPY.**

An Atlas of Ophthalmoscopy, containing 12 Full-page Chromo-Lithographic Plates, with 59 Figures. By R. LIEBREICH, M.D. Second Edition, Enlarged. Large Quarto. Price \$12.00

**LIVEING, ON SICK HEADACHE.**

Megrim, or Sick Headache and Some Allied Disorders. By EDWARD LIVEING, M.D. With Plates, Tables, etc. 8vo. Price \$5.50

**LEBER AND ROTTENSTEIN, DENTAL CARIES.**

Dental Caries and Its Causes. An Investigation into the Influence of Fungi in the Destruction of the Teeth. By Drs. LEBER and ROTTENSTEIN. Illustrated. 8vo. Price \$1.25

"The work gives the result of patient observation, presents the deductions of its authors with a perspicuity and modesty calculated to secure for its positions a thoughtful consideration. We heartily commend it as an educational work."—*Dental Cosmos*.

**LEWIN, ON SYPHILIS.**

The Treatment of Syphilis. By Dr. GEORGE LEWIN, of Berlin. Translated by CARL PROEGLER, M.D., and E. H. GALE, M.D., Surgeons U. S. Army. Illustrated. 12mo. Price \$1.50

"When such authorities as Dr. Drysdale (as we quoted a few weeks ago) condemn the use of mercury in syphilis as "too dangerous," while, on the other hand, eminent surgeons, such as Professor Gross, will not treat a case without that drug, general practitioners will gladly welcome any *media via* which gives us all the good effects of mercurials without any danger of their ill results appearing. This is what is accomplished by Dr. Lewin."—*Philadelphia Medical and Surgical Reporter*.

**LIZARS, ON TOBACCO.**

The Use and Abuse of Tobacco. By JOHN LIZARS, M.D. 12mo. Price .50

**LONGLEY, POCKET MEDICAL LEXICON.**

Students' Pocket Medical Dictionary, Giving the Correct Definition and Pronunciation of all Words and Terms in General Use in Medicine and the Collateral Sciences, with an Appendix, containing Poisons and their Antidotes, Abbreviations Used in Prescriptions, and a Metric Scale of Doses. By ELIAS LONGLEY. 24mo. Price, Cloth, \$1.00; Tucks and Pocket \$1.25

This is an entirely new Medical Dictionary, containing some 300 compactly printed 24mo pages, very carefully prepared by the author, who has had much experience in the preparation of similar works, assisted by the Professors of Chemistry and of Botany in one of our leading medical colleges.

"This little book will be welcomed by students in medicine and pharmacy as a convenient pocket companion, giving the pronunciation, acceptation, and definition of medical, pharmaceutical, chemical and botanical terms."—*American Journal of Pharmacy*.

"It would seem to be just the book for dental and medical students."—*Dental Advertiser*.

"It is, we believe, also the only lexicon in existence in which the pronunciation of words is fully and distinctly marked."—*Canada Medical Review*.

"This is a very compact and complete little dictionary. We commend it as particularly useful to students."—*New York Medical Journal*.

**MARTIN, ATLAS OF GYNÆCOLOGY.**

An Atlas of Obstetrics and Gynæcology. By Prof. A. MARTIN, of Berlin. Translated and edited from the Second German Edition, with additions, by FAN-COURT BARNES, M.D., M.R.C.P. With 98 Full-page Lithographic Plates, containing over 400 figures, many being colored. With full letter-press references to and explanations of each figure; forming a thick quarto volume. Bound in heavy beveled boards. *Sold only by subscription*. Price \$12.00

"This valuable and classic series of illustrations includes 98 pages of plates, with an average of 5 illustrations on each, many of which are colored, and some drawn on a large scale, so as to occupy the whole page. The subjects treated range through the whole of midwifery and gynæcology, beginning with normal and abnormal pelvis, and ending with illustrations of some of the most important obstetric gynæcologic instruments used in Germany and in this country. . . . The descriptive letter-press is very full and accurate, and the whole makes an extremely handsome volume."—*British Medical Journal*, July 10th, 1880.

"The atlas is the most complete and comprehensive work of its kind. . . . Nearly every point, anatomical, physiological, obstetrical, and gynæcological, is illustrated in the best way, by well known authors, from whose works the late Dr. Martin culled his illustrations. As a work of reference, to the practitioner, the atlas is invaluable; while to the student who wishes to refresh his memory in the readiest way and in the shortest time, it will be very useful."—*London Medical Record*, July 15th, 1880.

**MACDONALD, MICROSCOPICAL EXAMINATION OF WATER.**

A Guide to the Microscopical Examination of Drinking Water. By J. D. MACDONALD, M.D. With Twenty Full-page Lithographic Plates, Reference Tables, etc. 8vo. Price \$2.75

"The volume is an excellent hand-book and will greatly facilitate the study of the subject."—*Popular Science Monthly*.

**MACEWEN, ON OSTEOTOMY.**

An Inquiry into the Ætiology and Pathology of Knock-knee, Bow-leg and other Osseous Deformities of the Lower Limbs. By WM. MACEWEN, M.D. Illustrated. 8vo. Price \$3.00

## MACKENZIE, ON THE THROAT AND NOSE.

Including the Pharynx, Larynx, Trachea, Œsophagus, Nasal Cavities, and Neck. By MORELL MACKENZIE, M.D., London, Senior Physician to the Hospital for Diseases of the Chest and Throat, Lecturer on Diseases of the Throat at London Hospital Medical College, etc., etc. Vol. 1, containing the Pharynx, Larynx and Trachea, with 112 Illustrations. Now ready.

Price, Cloth, \$4.00; Sheep, \$5.00

Author's Edition, with the Original Illustrations. Published from early sheets, by arrangement with Dr. Mackenzie. Vol. 2 in preparation.

"We have long felt the want of a thoroughly practical and systematic treatise on diseases of the throat and nasal passages. Admirable essays have from time to time appeared; no standard work has been written. Any one familiar with laryngoscopic work must appreciate the valuable addition now made to this special department in the work before us. The entire work will include the consideration of affections of the pharynx, larynx, trachea, œsophagus, nasal cavities, and neck. The matter now presented complete for the first time is the result of the author's large and unrivaled experience, both in hospital and private practice, extending over a period of twenty years. There can be but one verdict of the profession on this manual—it stands without any competitor in medical literature, as a standard work on the organs it professes to treat of."—*Dublin Journal*.

"It is both practical and learned; abundantly and well illustrated; its descriptions of disease are graphic, and the diagnoses the best we have anywhere seen. To give examples of the thoroughness of Dr. Mackenzie's book, we may cite the chapter on diphtheria, which embraces 47 pages. The chapter on non-malignant tumors of the larynx would appear to be absolutely exhaustive. Nowhere else have we seen so elaborate a statement of the subject. We can predict for this work a high position, and congratulate its distinguished author upon its appearance."—*Philadelphia Medical Times*.

BY SAME AUTHOR.

## THE PHARMACOPEIA of the Hospital for Diseases of the Throat and Nose.

The Fourth Edition, much enlarged, containing 250 Formulæ, with Directions for their Preparation and Use. 16mo. Price \$1.25

## DIPHTHERIA. ITS NATURE AND TREATMENT.

12mo.

Price .75

CONTENTS.—1. The Definition and History. 2. The Etiology. 3. The Symptoms. 4. The Paralyzes. 5. The Diagnosis. 6. The Pathology. 7. The Prognosis. 8. The Treatment. 9. Laryngo-Tracheal Diphtheria. 10. Nasal Diphtheria. 11. Secondary Diphtheria.

"The terse remarks on prognosis are excellent; and what the Author says of treatment, general and local, and tracheotomy, we commend most cordially."—*New York Medical Journal*.

## GROWTHS IN THE LARYNX.

Their History, Causes, Symptoms, etc. With Reports and Analysis of one Hundred Cases. With Colored and Other Illustrations. 8vo. Price \$2.00

## MACNAMARA, DISEASES OF THE EYE.

A Manual of the Diseases of the Eye. By C. MACNAMARA, M.D. Third Edition, Carefully Revised; with Additions and Numerous Colored Plates, Diagrams of Eye, Wood-cuts, and Test Types. Demi 8vo. Price \$4.00

"As a book of ready reference on diseases of the eye it has no superior, and we may safely say, no equal in our language."—*Cincinnati Lancet and Observer*.

BY SAME AUTHOR.

## ON THE BONES AND JOINTS.

Lectures on Diseases of the Bones and Joints. Second Edition. Demi 8vo. Price \$4.25

## MADDEN, HEALTH RESORTS.

Health Resorts for the Treatment of Chronic Diseases. A Hand-Book, the result of the author's own observations during several years of health travel in many lands, containing also remarks on climatology and the use of mineral waters. By T. M. MADDEN, M.D. 8vo. Price \$2.50

"Rarely have we encountered a book containing so much information for both invalids and pleasure seekers."—*The Sanitarian*.



**MARSHALL & SMITH, ON THE URINE.**

The Chemical Analysis of the Urine. By JOHN MARSHALL, M.D., and EDGAR F. SMITH, M.D., of the Chemical Laboratory, Medical Department, University of Pennsylvania. Illustrated by Phototype Plates. 12mo. Price \$1.00

**MARSHALL, ANATOMICAL PLATES;**

Or Physiological Diagrams. Life Size (7 by 4 feet) and Beautifully Colored. By JOHN MARSHALL, F.R.S. An Entirely New Edition, Revised and Improved, Illustrating the Whole Human Body. The Set, Eleven Maps, in Sheets, Price \$50.00  
 " " handsomely Mounted on Canvas, with Rollers, and Varnished, Price \$80.00  
 An Explanatory Key to the Diagrams, Price .50

Dr. Marshall's Plates, from their size and perfection of drawing and coloring, excel any diagrams that have been published. They have proved invaluable in Medical Schools and Lecture Rooms. The low price at which they are offered brings them within reach of all.

No. 1. The Skeleton and Ligaments. No. 2. The Muscles, Joints, and Animal Mechanics. No. 3. The Viscera in Position—The Structure of the Lungs. No. 4. The Organs of Circulation. No. 5. The Lymphatics or Absorbents. No. 6. The Digestive Organs. No. 7. The Brain and Nerves. No. 8. The Organs of the Senses and Organs of the Voice, Plate 1. No. 9. The Organs of the Senses, Plate 2. No. 10. The Microscopic Structure of the Textures, Plate 1. No. 11. The Microscopic Structure of the Textures, Plate 2.

**MARSDEN, ON CANCER.**

A New and Successful Mode of Treating Certain Forms of Cancer. By ALEXANDER MARSDEN, M.D. Second Edition. Colored Plates. 8vo. Price \$3.00

**MARTIN, MICROSCOPIC MOUNTING.**

A Manual of Microscopic Mounting. With Notes on the Collection and Examination of Objects, and upwards of 150 Illustrations. By JOHN H. MARTIN. Second Edition, Enlarged. 8vo. Price \$2.75

**MORRIS, ON THE JOINTS.**

The Anatomy of the Joints of Man. Comprising a Description of the Ligaments, Cartilages, and Synovial Membranes; of the Articular Parts of Bones, etc. By HENRY MORRIS, F.R.C.S. Illustrated by 44 Large Plates and Numerous Figures, many of which are Colored. 8vo. Price \$5.50

**MUTER, MEDICAL AND PHARMACEUTICAL CHEMISTRY.**

An Introduction to Pharmaceutical and Medical Chemistry. PART ONE.—Theoretical and Descriptive. PART TWO.—Practical and Analytical. Arranged on the principle of the Course of Lectures on Chemistry as delivered at, and the Instruction given in the Laboratories of, the South London School of Pharmacy. By JOHN MUTER, M.D., President of the Society of Public Analysts. A Second Edition, Enlarged and Rearranged. The Two Parts bound in one large octavo volume. Price \$6.00

PART TWO.—Practical and Analytical. Bound Separately, for the Special Convenience of Students. Large 8vo. Cloth. Price \$2.50

**MAC MUNN, THE SPECTROSCOPE.**

The Spectroscope in Medicine. By CHAS. A. MAC MUNN, M.D. With 3 Chromo-lithographic Plates of Physiological and Pathological Spectra, and 13 Wood Cuts. 8vo. Price \$3.00

"This book is, without question, the best that has yet been published on the subject; to those not familiar with Physiological Spectroscopy it will prove interesting, while to those who are working in this field it is a necessity."—*New York Medical Journal*.

It is eminently a book which will teach the Student. — *Practitioner.*

It forms one of the most convenient, practical, and concise books yet published on the subject. — *London Lancet.*

## MEADOWS' MANUAL OF OBSTETRICS.

THE THIRD REVISED AND ENLARGED EDITION, NOW READY.

WITH ONE HUNDRED AND FORTY-FIVE ILLUSTRATIONS.

INCLUDING THE SIGNS AND SYMPTOMS OF PREGNANCY, Obstetric Operations, Diseases of the Puerperal State, &c., &c. By ALFRED MEADOWS, M. D., Physician to the Hospital for Women, to the General Lying-in Hospital, &c., &c. Revised and Enlarged Edition. With numerous Illustrations. Price \$2.00

In this new edition, . . . not merely is the practical treatment of Labor, and also of the Diseases and Accidents of Pregnancy, well and clearly taught, but the anatomical machinery of parturition is more effectively explained than in any other treatise that we remember; besides this, the book is honorably distinguished among manuals of Midwifery by the fulness with which it goes into the subject of the structure and development of the ovum. On all questions of treatment, whether by medicines, by hygienic regimen, or by mechanical or operative appliances, this treatise is as satisfactory as a work of manual size could be; students and practitioners can hardly do better than adopt it as their vade-mecum. — *The Practitioner.*

Upwards of ninety new engravings have been inserted in this edition, and, with a view to facilitate reference, the author has furnished it with a very full and complete table of contents and index. We can cordially recommend this manual as accurate and practical, and as containing in a small compass a large amount of the kind of information suitable alike to the student and practitioner. — *London Lancet.*

It is concise, well arranged, and remarkably complete, as a guide to the student during his lecture term; and as a ready reference to the Physician, no work of similar character equals it in value. — *Buffalo Medical Journal.*

The systematic arrangement of subjects, and the concise, practical style in which it is written, make the work especially valuable as a student's manual, while a very full table of contents and index renders it easily accessible as a work of reference. — *Chicago Medical Examiner.*

There can be no doubt that this manual will be generally accepted as a brief, convenient, and compendious guide to the study and practice of the Obstetric Art. — *Richmond and Louisville Medical Journal.*

We cannot but feel that every teacher of obstetrics has good cause to congratulate himself on being able to put in the hands of the student a book which contains so much valuable and reliable information in so condensed a form. — *Philadelphia Medical Times.*

It is concisely and clearly written, and the information is on the whole on a level with the most recent knowledge of the day. — *British and Foreign Medical Review.*

A work which embodies a larger amount of practical information than any other book on the subject. — *Pacific Medical and Surgical Journal.*

It is with great gratification that we are enabled to class Dr. Meadows' Manual as a rare exception, and to pronounce it an accurate, practical, and creditable work, and to unhesitatingly recommend it to both student and practitioner. — *American Journal of Obstetrics.*

It is a book of decided merit: every page teems with sound, practical common sense, advice and suggestions. — *Kansas City Medical Journal.*



**MENDENHALL, VADE MECUM.**

The Medical Student's Vade Mecum. A Compend of Anatomy, Physiology, Chemistry, The Practice of Medicine, Surgery, Obstetrics, etc. By GEORGE MENDENHALL, M.D. Eleventh Edition. 224 Illustrations. 8vo. Price \$2.00

**MEIGS AND PEPPER, DISEASES OF CHILDREN.**

A Practical Treatise on the Diseases of Children. By J. FORSYTH MEIGS, M.D., Fellow of the College of Physicians of Philadelphia, etc., etc., and WILLIAM PEPPER, M.D., Physician to the Philadelphia Hospital, Provost University of Pennsylvania. Seventh Edition, thoroughly Revised and Enlarged. A Royal Octavo Volume of over 1000 pages. Price, Cloth, \$6.00; Leather, \$7.00

"With the recent additions it may safely be pronounced one of the best and most comprehensive works on Diseases of Children."—*New York Medical Journal*.

"Must be regarded as the most complete work on Diseases of Children in our language."—*Edinburgh Medical Journal*.

"We have seldom met with a text-book so complete, so just and so readable as the one before us."—*American Journal of Obstetrics*.

**MATHIAS, LEGISLATIVE MANUAL.**

A Rule for Conducting Business in Meetings of Societies, Legislative Bodies, Town and Ward Meetings, etc. By BENJ. MATHIAS, A.M. Sixteenth Edition. 16mo. Price .50

**MORTON, REFRACTION OF EYE.**

The Refraction of the Eye. Its Diagnosis and the Correction of its Errors. With Chapter on Keratotomy. By A. STANFORD MORTON, M.B., F.R.C.S. 12mo. Price \$1.00

"The author has not only given very thorough rules for the objective and subjective examinations of the eye in the various conditions of refraction which present themselves, but has entered into an explanation of the phenomena observed, which is at once scientific and elementary."—*Edinburgh Medical Journal*.

**MEARS, PRACTICAL SURGERY.**

Practical Surgery. Including: Part I.—Surgical Dressings; Part II.—Bandaging; Part III.—Ligations; Part IV.—Amputations. With 227 Illustrations. By J. EWING MEARS, M.D., Demonstrator of Surgery in Jefferson Medical College, and Professor of Anatomy and Clinical Surgery in the Pennsylvania College of Dental Surgery. 12mo. Price \$2.00

"Professor Mears has written a convenient and useful book for students. We can most cordially endorse it as fulfilling well the promise made in its modest preface."—*Cincinnati Lancet and Clinic*.

"It contains a great deal of information upon the subjects of which it treats, in a convenient and condensed form. Each division is well illustrated, thereby rendering the text doubly clear."—*New York Medical Record*.

**OLDBERG, PRESCRIPTION BOOK.**

Three Hundred Prescriptions, Selected Chiefly from the Best Collections of Formulæ used in Hospital and Out-patient-practice, with a Dose Table, and a Complete Account of the Metric System. By OSCAR OLDBERG, PHAR. D., Late Medical Purveyor, United States Marine Hospital Service; Professor of Materia Medica, National College of Pharmacy, Washington, D. C.; Member of the American Pharmaceutical Association, and of the Sixth Decennial Committee of Revision and Publication of the Pharmacopœia of the United States. 12mo. Price \$1.50

The prescriptions given in this work are selected from the Pharmacopœias and formularies of the great Hospitals of New York, Philadelphia, Boston and London, or contributed from the practice of medical officers of the United States Service. The Dose Table includes nearly all of the remedies that have a place in the current *Materia Medica*.

BY SAME AUTHOR.

**THE UNOFFICIAL PHARMACOPŒIA.**

Comprising over 700 Popular and Useful Preparations, not Official in the United States, of the various Elixirs, Fluid Extracts, Mixtures, Syrups, Tinctures, Ointments, Wines, etc., etc., in constant demand throughout the country. Thick 12mo. 503 pp. Half Morocco. Price \$3.50

*Sold by Subscription.*

IT WILL PROVE A USEFUL SUPPLEMENT TO THE PHARMACOPŒIA OF THE UNITED STATES; the aim has been to make it as complete as practicable. The formulæ can, with a minimum of labor, be used with any system of weights and measures. The virtual adoption of the metric system in the forthcoming Pharmacopœia of the United States will account for the preference given to that system in this volume, which, however, does not prevent the ready use of the book with apothecaries' weights and measures. An extended account of the metric system has been given, accompanied by full tables of equivalents. The sources from which the formulæ have been gathered are believed to be the best. They include the Pharmacopœias of England, Germany, France and Sweden. The book is practically equivalent to the possession of these various Pharmacopœias, and the formulæ were selected with reference to their popularity, usefulness, and interesting character.

"This volume is one of the most practical and valuable contributions to Pharmaceutical work of recent publication. It has received high commendation from many of our best pharmacists."—*Lazell, Marsh & Gardiner, Wholesale Druggists, New York City.*

**OTT, ACTION OF MEDICINES.**

The Action of Medicines. By ISAAC OTT, M.D., late Demonstrator of Experimental Physiology in the University of Pennsylvania. With 22 Illustrations. 8vo. Price \$2.00

"This work is the only one in the English language which can offer, with any degree of completeness, that assistance and instruction so essential to the correct and successful study of pharmacology. Filling, as it does, this gap in medical literature, we have a work which cannot fail to be of the greatest value to students.

"From the pen of a man himself no novice in the subject of which he treats, it bears upon it the impress of reliability, due to the author's own experience, a virtue too often wanting in mere compilations of the works of others."—*American Journal of Medical Sciences.*

**PAGET, SURGICAL PATHOLOGY.**

Lectures on Surgical Pathology, Delivered at the Royal College of Surgeons. By JAMES PAGET, F.R.S. Third Edition. Edited by WILLIAM TURNER, M.D. With Numerous Illustrations. 8vo. Price, Cloth, \$7.00; Leather, \$8.00

**PARKES, PRACTICAL HYGIENE. Fifth Edition.**

A Manual of Practical Hygiene. By EDWARD A. PARKES, M.D. The Fifth, Revised and Enlarged Edition. With Many Illustrations. 8vo. Price \$6.00

"Altogether it is the most complete work on Hygiene which we have seen."—*New York Medical Record.*

"We find that it never fails to throw light on any hygienic question which may be proposed."—*Boston Medical and Surgical Journal.*

"We commend the book heartily to all needing instruction (and who does not), in Hygiene."—*Chicago Medical Journal.*

**PIESSE, THE MANUFACTURE OF PERFUMERY. Fourth Edition.**

The Art of Perfumery; or the Methods of Obtaining the Odors of Plants, and Instruction for the Manufacture of Perfumery, Dentifrices, Soap, Scented Powders, Odorous Vinegars and Salts, Snuff, Cosmetics, etc., etc. By G. W. SEPTIMUS PIESSE. Fourth Edition. Enlarged. 366 Illustrations. 8vo. Cloth. Price \$5.50

"An excellent book."—*Commercial Advertiser.*

"It is the best book on Perfumery yet published."—*Scientific American.*

"Exceedingly useful to druggists and perfumers."—*Journal of Chemistry.*

"Is in the fullest sense, comprehensive."—*Medical Record.*

**PENNSYLVANIA HOSPITAL REPORTS.**

Edited by a Committee of the Hospital Staff. J. M. DACOSTA, M.D., and WILLIAM HUNT, M.D. Vols. 1 and 2, containing Original Articles by former and present Members of the Staff. With Lithographic and other Illustrations. 8vo. Price, per volume, \$2.00

These volumes consist of papers of a practical character, based chiefly on observations made at the Hospital, but containing the further experience of the Members of the Staff. In issuing the second volume the Editors express their acknowledgments for the very favorable reception of the first by the profession and press of this country and Europe.

**PEREIRA, PRESCRIPTION BOOK. Sixteenth Edition.**

Physician's Prescription Book. Containing Lists of Terms, Phrases, Contractions and Abbreviations used in Prescriptions, Explanatory Notes, Grammatical Construction of Prescriptions, Rules for the Pronunciation of Pharmaceutical Terms. By JONATHAN PEREIRA, M.D., F.R.S. Sixteenth Edition. Price, Cloth, \$1.00; Leather, with tucks and pocket, \$1.25

**PIGGOTT, ON COPPER.**

Copper Mining and Copper Ore. With a full Description of the Principal Copper Mines of the United States, the Art of Mining, etc. By A. SNOWDEN PIGGOTT. 12mo. Price \$1.00

**PRINCE, ORTHOPEDIC SURGERY.**

Plastic and Orthopedic Surgery. By DAVID PRINCE, M.D. Containing a Report on the Condition of, and Advance made in, Plastic and Orthopedic Surgery, etc., etc., and Numerous Illustrations. 8vo. Price \$4.50

**PHYSICIAN'S VISITING LIST, PUBLISHED ANNUALLY.****THIRTY-FIRST YEAR OF ITS PUBLICATION.****SIZES AND PRICES.**

For 25 Patients weekly.	Tucks, pockets, and pencil,	- - - -	\$1.00
50 " "	" " " "	- - - -	1.25
75 " "	" " " "	- - - -	1.50
100 " "	" " " "	- - - -	2.00
50 " " 2 vols.	{ Jan. to June }	" - - - -	2.50
	{ July to Dec. }		
100 " " 2 vols.	{ Jan. to June }	" - - - -	3.00
	{ July to Dec. }		

**INTERLEAVED EDITION.**

For 25 Patients weekly, interleaved, tucks, pockets, etc.,	- - - -	1.25
50 " " " "	- - - -	1.50
50 " " 2 vols.	{ Jan. to June }	3.00
	{ July to Dec. }	

The Visiting List contains a New Table of Poisons and their Antidotes. The Metric or French Decimal System of Weights and Measures. Posological Tables, showing the relation of our present system of Apothecaries' Weights and Measures to that of the Metric System, giving the Doses in both.

This last is a most valuable addition, and will materially aid the Physician. So many writers now use the metric system, especially in foreign books and journals, that one not familiar with it is constantly confused, and in many cases unable to understand the measurements or doses.

"It is certainly the most popular Visiting List extant."—*New York Medical Journal*.

"Its compact size, convenience of arrangement, durability, and neatness of manufacture have everywhere obtained for it a preference."—*Canada Lancet*.

"The book is convenient in form, not too bulky, and in every respect the very best Visiting List published."—*Canada Medical and Surgical Journal*.

"This standard Visiting List, for completeness, compactness, and simplicity of arrangement, is excelled by none in the market."—*New York Medical Record*.



**POWER, HOLMES, ANSTIE AND BARNES (Drs.).**

Reports on the Progress of Medicine, Surgery, Physiology, Midwifery, Diseases of Women and Children, Materia Medica, Medical Jurisprudence, Ophthalmology, etc., etc. Reported for the New Sydenham Society. 8vo. Price \$2.00

**PURCELL, ON CANCER.**

Cancer. Its Allies and other Tumors, with Special Reference to their Medical and Surgical Treatment. By F. ALBERT PURCELL, M.D., M.R.C.S. Surgeon to the Cancer Hospital, Brompton, England. 8vo. Price \$3.75

**RADCLIFFE, ON EPILEPSY.**

On Epilepsy, Pain, Paralysis, and other Disorders of the Nervous System. By CHARLES BLAND RADCLIFFE, M.D. Illustrated. 12mo. Price \$1.50

"To no authority can the medical inquirer turn for an analysis of the phenomena of epilepsy with more satisfaction than to the admirable essay of Dr. Radcliffe."—*American Journal Medical Sciences*.

**ROBERTS, MANUAL OF MIDWIFERY.**

The Student's Guide to the Practice of Midwifery. By D. LLOYD ROBERTS, M.D., F.R.C.P., Physician to St. Mary's Hospital, Manchester, etc., etc. Second Edition. With 95 Illustrations. 12mo. Price \$2.00

"As an obstetrical manual, we think that of Dr. Roberts one of the best now offered to the Profession, as it comes with authority, and he possesses the ability to condense, and at the same time present a subject clearly."

—*American Journal of Medical Science*.  
"Concise, clear, and practical."—*Medical Press and Circular*.

"The present edition has been very thoroughly revised, some chapters having been entirely re-written. For its size, it forms a remarkably complete compendium of the subject, and can hardly be surpassed in the simplicity and clearness of its explanations."—*Obstetrical Journal of Great Britain and Ireland*.

**REYNOLDS, ELECTRICITY.**

Lectures on the Clinical Uses of Electricity. By J. RUSSELL REYNOLDS, M.D., F.R.S. Second Edition. 12mo. Price \$1.00

"It is thoroughly reliable as a guide, very concise, and will be found exceedingly useful to the general practitioner."—*Canada Lancet*.

**RICHARDSON, MECHANICAL DENTISTRY. Third Edition.**

A Practical Treatise on Mechanical Dentistry. By JOSEPH RICHARDSON, D.D.S. Third Edition. With 185 Illustrations. 8vo. Price, Cloth, \$4.00; Leather, \$4.75

"Taken as a whole, Professor Richardson's work is a valuable contribution to the dental art, and is beyond all question the best treatise extant upon the general subject of Mechanical Dentistry."—*Dental Cosmos*.

**RIGBY AND MEADOWS, OBSTETRIC MEMORANDA.**

Dr. Rigby's Obstetric Memoranda. Fourth Edition. Revised. By ALFRED MEADOWS, M.D. 32mo. Price .50

**RINDFLEISCH, PATHOLOGICAL HISTOLOGY.**

A Text-Book of Pathological Histology. By Dr. EDWARD RINDFLEISCH. Translated by Drs. WM. C. KOLMAN and F. T. MILLER. 208 Illustrations. 8vo. Price, Cloth, \$5.00; Leather, \$6.00

Recommended as a Text-Book at the University of Pennsylvania and other Medical Schools.

"To be up with the times our Pathologists must make themselves familiar with the thorough, clear and almost exhaustive teachings of Professor Rindfleisch."—*Ohio Medical and Surgical Reporter*.

"In conclusion we cordially recommend it as the best treatise on the subject."—*American Journal of Medical Science*.

**RYAN, ON MARRIAGE.**

The Philosophy of Marriage. In its Social, Moral and Physical Relations, and Diseases of the Urinary Organs. By MICHAEL RYAN, M.D. Member of the Royal College of Physicians, London. 12mo. Price \$1.00

# ROBERTS' PRACTICE OF MEDICINE.

A New Enlarged Edition,

**JUST READY.**

Uniformly commended by the Profession and the Press.

A HAND-BOOK OF THE THEORY AND PRACTICE OF MEDICINE. By FREDERICK T. ROBERTS, M.D., M.R.C.P., Assistant Professor and Teacher of Clinical Medicine in University College Hospital, Assistant Physician in Brompton Consumptive Hospital, &c., &c.  
Third Edition. Octavo. Price, in cloth . . . . . \$5.00  
leather . . . . . 6.00

The Publishers are in receipt of numerous letters from Professors in the various Medical Schools, uniformly commending this book; whilst the following extracts from the Medical Press, both English and American, fully attest its superiority and great value not only to the student, but also to the busy practitioner.

This is a good book, yea, a very good book. It is not so full in its Pathology as "Aitken," so charming in its composition as "Watson," nor so decisive in its treatment as "Tanner;" but it is more compendious than any of them, and therefore more useful. We know of no other work in the English language, or in any other, for that matter, which competes with this one. — *Edinburgh Medical Journal*.

We have much pleasure in expressing our sense of the author's conscientious anxiety to make his work a faithful representation of modern medical beliefs and practice. In this he has succeeded in a degree that will earn the gratitude of very many students and practitioners: it is a remarkable evidence of industry, experience, and research. — *Practitioner*.

That Dr. Roberts's book is admirably fitted to supply the want of a good hand-book of medicine, so much felt by every medical student, does not admit of a question. — *Students' Journal and Hospital Gazette*.

Dr. Roberts has accomplished his task in a satisfactory manner, and has produced a work mainly intended for students that will be cordially welcomed by them; most of the observations on treatment are carefully written and worthy of attentive study; the arrangement is good, and the style clear and simple. — *London Lancet*.

It contains a vast deal of capital instruction for the student, much valuable matter in it to commend, and merit enough to insure for it a rapid sale. — *London Medical Times and Gazette*.

There are great excellencies in this book, which will make it a favorite both with the accurate student and busy practitioner. The author has had ample experience. — *Richmond and Louisville Journal*.

We confess ourselves most favorably impressed with this work. The author has performed his task most creditably, and we cordially recommend the book to our readers. — *Canada Medical and Surgical Journal*.

A careful reading of the book has led us to believe that the author has written a work more nearly up to the times than any that we have seen; to the student, it will be a gift of priceless value. — *Detroit Review of Medicine*.

Our opinion of it is one of almost unqualified praise. The style is clear, and the amount of useful and, indeed, indispensable information which it contains is marvellous. We heartily recommend it to students, teachers, and practitioners. — *Boston Med. and Surgical Journal*.

It is of a much higher order than the usual compilations and abstracts placed in the hands of students. It embraces many suggestions and hints from a carefully compiled hospital experience; the style is clear and concise, and the plan of the work very judicious. — *Medical and Surgical Reporter*.

It is unsurpassed by any work that has fallen into our hands as a compendium for students preparing for examination. It is thoroughly practical and fully up to the times. — *The Clinic*.

We find it an admirable book. Indeed, we know of no hand-book on the subject just now to be preferred to it. We particularly commend it to students about to enter upon the practice of their profession. — *St. Louis Medical and Surgical Journal*.

If there is a book in the whole of medical literature in which so much is said in so few words, it has never come within our reach. So clear, terse, and pointed is the style; so accurate the diction, and so varied the matter of this book, that it is almost a dictionary of practical medicine. — *Chicago Medical Journal*.





**SMITH, ON CHILDREN.**

Clinical Studies of Diseases in Children. By EUSTACE SMITH, M.D. 12mo.  
Price \$2.50

**MEDICAL HERESIES, HISTORICALLY CONSIDERED.**

A Series of Critical Essays on the Origin and Evolution of Sectarian Medicine, embracing a Special Sketch and Review of Homœopathy, Past and Present. By GONZALVO C. SMYTHE, A.M., M.D. Professor of the Principles and Practice of Medicine, College of Physicians and Surgeons, Indianapolis, Indiana. 12mo. Cloth.  
Price \$1.25

"This book gives, in a small compass, an excellent history of medicine, from its earliest day to the present time."—*Buffalo Medical and Surgical Journal*.

"Cannot fail to be of interest, not only to the medical profession, but to the general reader."—*Baltimore Gazette*.

"The work is pleasantly written, in an easy, familiar style, and has cost the writer much literary research."—*New York Medical Journal*.

"Students and others interested in the subject of medicine will find a digest of the entire controversy (between the various schools of medicine) presented in this volume."—*Journal of Education*.

"Professor Smythe has succeeded in writing a brief, clear, and interesting sketch of the evolution of medical eccentricities, and of modern homœopathy, its facts and fallacies."—*Philadelphia Medical Times*.

**SAVAGE, FEMALE PELVIC ORGANS. Author's Edition.**

The Surgery, Surgical Pathology and Surgical Anatomy of the Female Pelvic Organs. In a Series of Colored Plates taken from Nature, with Commentaries, Notes and Cases. By HENRY SAVAGE, M.D., F.R.C.S. New Edition. Issued by arrangement with the Author, from the original Plates. Quarto. [Preparing.]

**SAVORY & MOORE, DOMESTIC MEDICINE.**

A Condensed Compend of Domestic Medicine, and Companion to the Medicine Chest. By Drs. SAVORY and Moore. Illustrated. 16mo. Price .50

**SCHULTZE, OBSTETRICAL PLATES.**

Obstetrical Diagrams. Life Size. By Prof. B. S. SCHULTZE, M.D., of Berlin. Twenty in the Set. Colored.

Price, in Sheets, \$15.00; Mounted on Rollers \$25.00

**SCANZONI, DISEASES OF WOMEN.**

A Practical Treatise on the Diseases of the Sexual Organs of Women. By Dr. F. W. VON SCANZONI. Translated by A. K. GARDINER, M.D. 8vo.

Price \$5.00

**SIEVEKING, LIFE ASSURANCE.**

The Medical Adviser in Life Assurance. By E. H. SIEVEKING, M.D. 12mo.  
Price \$2.00

**SHEPPARD, ON MADNESS.**

Madness, in its Medical, Social and Legal Aspects. A Series of Lectures delivered at King's Medical College, London. By EDGAR SHEPPARD, M.D. 8vo.  
Price \$2.25

**STOCKEN, DENTAL MATERIA MEDICA. Second Edition.**

The Elements of Dental Materia Medica and Therapeutics with Pharmacopœia. By JAMES STOCKEN, D.D.S. Second Edition. 12mo. Price \$2.25

The first edition of this book was disposed of in a little less than four months. In making this revision the author has endeavored to make it still more useful by the addition of considerable new matter.

**SUTTON, VOLUMETRIC ANALYSIS. Fourth Edition.**

A Systematic Handbook of Volumetric Analysis, or the Quantitative Estimation of Chemical Substances by Measure, Applied to Liquids, Solids and Gases. By FRANCIS SUTTON, F.C.S. Fourth Edition. Revised and Enlarged, with Illustrations. 8vo. [Preparing.]



**SEWELL, DENTAL ANATOMY AND SURGERY.**

A Manual of Dental Anatomy and Surgery, Including the Extraction of Teeth.

By H. E. SEWELL, D.D.S., M.D. With 77 Illustrations. 12mo. Price \$1.50

"A valuable book for the general Practitioner who is in want of a practical manual relating especially to diseases of the teeth."—*Medical Brief*.

"It will be found useful to the general Practitioner in the management of many incidental affections connected with the teeth and mouth, which cannot always be handed over to the specialist."—*Pacific Med. Journal*.

**STILLE, ON MENINGITIS.**

Epidemic Meningitis, or Cerebro-spinal Meningitis. By ALFRED STILLE, M.D.,

Professor of Practice at the University of Pennsylvania. 8vo. Price \$2.00

"The name of the author is a sufficient guarantee that this monograph is elegant in style, exhaustive of its subject and rich with practical suggestions."—*Philadelphia Medical and Surgical Reporter*.

**STOKES, DISEASES OF THE HEART.**

The Diseases of the Heart and Aorta. By WILLIAM STOKES, M.D. Thick

8vo. Price \$3.00

**SWAIN, SURGICAL EMERGENCIES.**

Surgical Emergencies: Concise Descriptions of the Various Accidents and Emergencies, with Directions for their Treatment. By WM. PAUL SWAIN, F.R.C.S.

Eighty-two Illustrations. 12mo. Price \$2.00

CONTENTS.—CHAPTER I. Injuries to the Head. II. Injuries to the Eye. III. Injuries to the Mouth, Pharynx, Oesophagus, and Larynx. IV. The Chest. V. The Upper Extremity. VI. The Abdomen. VII. The Pelvis. VIII. The Lower Extremity. IX. Emergencies connected with Parturition. X. Poisoning. XI. Antiseptic Treatment. XII. Apparatus and Dressing.

"Many surgeons will thank Dr. Swain for the trouble he has taken to put them easily in possession of this refresher of half forgotten knowledge."—*The Practitioner*.

**SWERINGEN, PHARMACEUTICAL LEXICON.**

A Pharmaceutical Lexicon or Dictionary of Pharmaceutical Science. Containing explanations of the various subjects and terms of Pharmacy, with appropriate selections from the Collateral Sciences. Formulæ for Official, Empirical, and Dietetic Preparations, etc., etc. By HIRAM V. SWERINGEN, M.D. 8vo.

Price, Cloth, \$3.00; Leather, \$4.00

"It is worthy of a welcome, and sure of a ready recognition of its merits."—*London Pharmaceutical Journal*.

"It will prove of great service to the pharmaceutical student, apprentice, pharmacist, druggist and physician, as a book of ready reference and as an aid to the study of scientific works."—*American Journal of Pharmacy*.

**THOMPSON, LITHOTOMY AND LITHOTRITY.**

Practical Lithotomy and Lithotripsy; or, an Inquiry into the best Modes of

Removing Stone from the Bladder. By SIR HENRY THOMPSON, F.R.C.S., Emer-

itus Professor of Clinical Surgery in University College. Third Edition. 8vo.

With 87 Engravings. Price \$3.50

"The chapters of most interest are those in which Bigelow's operation is discussed, and the final one, in which is a record of 500 operations for stone in cases of male adults under the author's care. Such a table has never before been compiled by any surgeon."—*Lancet*.

BY SAME AUTHOR.

**URINARY ORGANS.**

Diseases of the Urinary Organs. Clinical Lectures. Fifth London Edition.

8vo. With 2 Plates and 71 Engravings. Price \$3.50

**ON THE PROSTATE.**

Diseases of the Prostate. Their Pathology and Treatment. Fourth London

Edition. 8vo. With numerous Plates. Price \$4.00

**CALCULOUS DISEASES.**

The Preventive Treatment of Calculous Disease, and the Use of Solvent

Remedies. Second Edition. 16mo. Price \$1.00

"Catholic in his investigation of the fruit of the labor of others, cautious in all his deductions, rejecting all specious theories in the effort to obtain practically useful results, as clever with his pen as he is with the sound or lithotrite, one can scarcely wonder that he is esteemed the master that he is."—*American Journal of Medical Science*.

## TROUSSEAU'S CLINICAL MEDICINE.

COMPLETE.

In Two Large Royal Octavo Volumes.

EMBRACING ALL THE LECTURES CONTAINED IN THE FIVE  
VOLUME EDITION AS ISSUED BY THE  
SYDENHAM SOCIETY.

Price, handsomely bound in cloth . . . . .	\$ 8.00
“ “ “ leather . . . . .	10.00

## Lectures on Clinical Medicine.

Delivered at the Hôtel Dieu, Paris, by A. TROUSSEAU, Professor of Clinical Medicine to the Faculty of Medicine, Paris, &c., &c. Translated from the Third Revised and Enlarged Edition by P. VICTOR BAZIRE, M. D., London and Paris; and JOHN ROSE CORMACK, M. D., Edinburgh, F. R. S., &c. With a full Index, Table of Contents, &c.

Trousseau's Lectures have attained a reputation both in England and in this country far greater than any work of a similar character heretofore written, and, notwithstanding but few medical men could afford to purchase the expensive edition issued by the Sydenham Society, it has had an extensive sale. In order, however, to bring the work within the reach of all the profession, the publishers now issue this edition, containing all the lectures as contained in the five-volume edition, at one-half the price. Below are a few only of the many favorable opinions expressed of the work :

“ It treats of diseases of daily occurrence and of the most vital interest to the practitioner. And we should think any medical library absurdly incomplete now which did not have alongside of Watson, Graves, and Tanner, the ‘Clinical Medicine’ of Trousseau.

“ The work is full of the results of the richest natural observation, and is the production of one who was enlightened enough to combine with new methods of investigation the vigorous and independent ideas of the old physicians whom he so eloquently magnifies. It is an extremely rich and valuable addition to the library of physicians and practitioners generally.”  
— *London Lancet*.

“ This book furnishes an example of the best kind of clinical teaching. It deserves to be popularized. We scarcely know of any work better fitted for presentation to a young man when entering upon the practical work of his life. The delineation of the recorded cases is graphic, and their narration devoid of that prolixity which, desirable as it is for purposes of extended analysis, is highly undesirable when the object is to point to a practical lesson.”  
— *London Medical Times and Gazette*.

“ The publication of Trousseau's Lectures furnishes medical men with one of the best practical treatises on disease as seen at the bedside. The conversational style adopted by the author lends animation to the work, and the translator deserves credit for having so well preserved the easy and ready style of the original.” — *British and Foreign Medico-Chirurgical Review*.

“ The great reputation of Prof. Trousseau as a practitioner and teacher of Medicine in all its branches, renders the present appearance of his Clinical Lectures particularly welcome.”  
— *Medical Press and Circular*.

“ A clever translation of Prof. Trousseau's admirable and exhaustive work, the best book of reference upon the Practice of Medicine.” — *Indian Medical Gazette*.

**TILT, THE CHANGE OF LIFE IN WOMEN.**

The Change of Life in Health and Disease. A Practical Treatise on the Diseases Incidental to Women at the Decline of Life. By EDWARD JOHN TILT, M.D. Third London Edition. 8vo. Price \$3.00

BY SAME AUTHOR.

**UTERINE THERAPEUTICS AND DISEASES OF WOMEN.**

A Hand-book of Diseases of Women and Uterine Therapeutics. Fourth London Edition. 12mo. Price \$3.50

**TOMES, DENTAL ANATOMY. New Edition.**

A Manual of Dental Anatomy, Human and Comparative. By C. S. TOMES, D.D.S. With 179 Illustrations. Second Edition. 12mo. [Preparing.]

**TOMES, DENTAL SURGERY.**

A System of Dental Surgery. By JOHN TOMES, F.R.S. The Second Edition, Revised and Enlarged. By C. S. TOMES, D.D.S. With 263 Illustrations. 12mo. Price \$5.00

"We rejoice that such books as these (Dr. Tomes' Works) are demanded by the profession, and that the men to write them are furnished by the profession."—*Dental Cosmos*.

**TAFT, OPERATIVE DENTISTRY. Third Edition.**

A Practical Treatise on Operative Dentistry. By JONATHAN TAFT, D.D.S. Third Revised and Enlarged Edition. Over 100 Illustrations. 8vo. Price, Cloth, \$4.25; Leather, 5.00

"All the important operations, in all their modifications, are clearly discussed by the author, and the work is highly practical throughout."—*Dental Register*.

"It is a thorough and complete treatise on the Art of Practical Dentistry."—*London Medical Times and Gazette*.

**TANNER, INDEX OF DISEASES. Second Edition.**

An Index of Diseases and their Treatment. By THOS. HAWKES TANNER, M.D., F.R.C.P. Sixth Edition. Revised and Enlarged. By W. H. BROADBENT, M.D. With Additions. Appendix of Formulæ, etc. 8vo. Price \$3.00

By this useful hand-book the character of any disease may be determined in a moment, and the general outline of treatment pursued by the best authorities made apparent.

"This work, like others from the gifted author, has already won for itself a reputation." "It is in truth what its title indicates."—*New York Medical Record*.

"Finally, a chapter on the climates, countries, mineral springs, etc., best adapted to the various classes of invalids, makes this work the most complete practitioner's manual that we have yet seen."—*Chicago Medical Times*.

BY SAME AUTHOR.

**THE DISEASES OF INFANCY.**

A Practical Treatise on the Diseases of Infancy and Childhood. Third Edition. Carefully Revised and much Enlarged. By ALFRED MEADOWS, M.D. 8vo. Price \$3.00

Recommended as a Text-book at Jefferson Medical College and other schools of Medicine.

"One of the most careful, ornate, and accessible manuals on the subject."—*London Lancet*.

"We consider the views of the author on the subject of therapeutics as rational in the highest degree."—*Boston Medical and Surgical Journal*.

**MEMORANDA OF POISONS.**

A Memoranda of Poisons and their Antidotes and Tests. Fourth American from the Last London Edition. Revised and Enlarged. Price .75

This most complete Toxicological Manual should be within reach of all physicians and pharmacists, and as an addition to every family library, would be the means of saving life and allaying pain when the delay of sending for a physician would prove fatal.



**TIBBETS, MEDICAL ELECTRICITY.**

A Hand-book of Medical Electricity. Giving full directions for its Application, etc. By HERBERT TIBBETS, M.D. 64 Illustrations. 8vo. Price \$1.50

**TOLAND, PRACTICAL SURGERY.**

Lectures on Practical Surgery. By H. H. TOLAND, M.D., Professor of Surgery, University of California. Second Edition. With Additions and Numerous Illustrations. 8vo. Price, Cloth, \$4.50; Leather, \$5.00

**TRANSACTIONS OF THE COLLEGE OF PHYSICIANS.**

The Transactions of the College of Physicians of Philadelphia. New Series. Vols. I, II, III, IV and V. 8vo. Price, per volume, \$2.50

**TYSON, BRIGHT'S DISEASE AND DIABETES.**

A Treatise on Diabetes and Bright's Disease. With Especial Reference to Pathology and Therapeutics. By JAMES TYSON, M.D., Professor of Pathology and Morbid Anatomy in the University of Pennsylvania. With Colored Plates and many Wood Engravings. 8vo. Price \$3.50

"This volume is the outcome of some fifteen years' special study and observation, and will be found to be a very well prepared monograph. . . . His directions are clear and minute.—*Med. and Surg. Reporter.*

"The symptoms are clearly defined, and the treatment is exceedingly well described, so that every one reading the book must be profited."—*Cincinnati Lancet and Clinic.*

BY SAME AUTHOR.

**GUIDE TO THE EXAMINATION OF URINE.**

A Practical Guide to the Examination of Urine. For the use of Physicians and Students. With Colored Plate, and Numerous Illustrations Engraved on Wood. Third Edition. 12mo. Price \$1.50

Advantage has been taken, in bringing out a new edition of this work, not only to correct the previous one, but to make such additions of new Facts and Processes as would add to its value without materially increasing its size.

"Dr. Tyson commences with a short account of the theory of renal secretion, the physical and chemical characters of the urine, and the reagents and apparatus used in its analysis. Excellent rules are then given for detecting the presence of albumen, sugar, coloring-matters, bile, urea, uric acid, chlorides, phosphates and sulphates; and minute instructions for approximative and quantitative determination of most of those ingredients by volumetric analysis are supplied."—*Philadelphia Medical Times.*

"We have experienced both pleasure and profit from the perusal of this book. It is agreeably written, contains much practical information, and is, we believe, a reliable and satisfactory guide to the clinical examination of urine. We can recommend Dr. Tyson's book as one that amply supplies the clinical needs of the physician."—*Dublin Journal of Medical Science.*

**THE CELL DOCTRINE. Second Edition.**

The Cell Doctrine. Its History and Present State. With a Copious Bibliography of the subject. Illustrated by a Colored Plate and Wood Cuts. Second Edition. 8vo. Price \$2.00

**TURNBULL, ARTIFICIAL ANÆSTHESIA.**

The Advantages and Accidents of Artificial Anæsthesia; Its Employment in the Treatment of Disease; Modes of Administration; Considering their Relative Risks; Tests of Purity; Treatment of Asphyxia; Spasms of the Glottis; Syncope, etc. By LAURENCE TURNBULL, M.D., PH.G., Aural Surgeon to Jefferson College Hospital, etc. Second Edition. Revised and Enlarged. With 27 Illustrations of Various Forms of Inhalers, etc. 12mo. Price \$1.50

"Anæsthesia is a subject of great interest and importance to physicians and dentists, and everything that will aid them in better understanding the subject is sought with great avidity. This work we regard as the best aid in the study of the subject, and it presents the subject up to the present hour."—*Dental Register.*

**TEALE, DANGERS TO HEALTH. Third Edition.**

A Pictorial Guide to Domestic Sanitary Defects. By T. PRIDJIN TEALE, M.D., F.R.C.S. With Colored Plates. 8vo. Price \$3.50

**VACHER, CHEMISTRY.**

A Primer of Chemistry, Including Analysis. By ARTHUR VACHER. 18mo.  
Price .50

**VIRCHOW, POST-MORTEM EXAMINATIONS. Second Edition.**

Post-mortem Examinations. A Description and Explanation of the Method of Performing them in the Dead House of the Berlin Charité Hospital, with especial reference to Medico-legal Practice. By Prof. VIRCHOW. Translated by Dr. T. P. SMITH. Second Edition. 12mo. With 4 Plates. Price \$1.25

"A most useful manual from the pen of a master. For thorough and systematic method in the performance of post-mortem examinations, there is no guide like it."—*Lancet*.

"Its low price and portability make it accessible and convenient to every surgical registrar and practitioner."—*British Medical Journal*.

**WAGSTAFFE, HUMAN OSTEOLOGY.**

The Student's Guide to Human Osteology. By WILLIAM WARWICK WAGSTAFFE, F.R.C.S. With 23 Lithographic Plates of the Bones, Showing Muscle Attachments, and 60 Wood Engravings. 12mo. Price \$3.00

**WALTON, DISEASES OF THE EYE. Third Edition.**

A Practical Treatise on Diseases of the Eye. By HAYNES WALTON, M.D. Third Edition. Rewritten and Enlarged. With five plain and three colored full-page Plates; and many other Illustrations, Test Types, etc. Nearly 1200 pages. 8vo. Price \$9.00

**WARNER, CASE TAKING.**

The Student's Guide to Medical Case Taking. By FRANCIS WARNER, M.D., M.R.C.P., etc. 12mo. Cloth. Price \$1.75

General Diseases.—Class 1. Class 2. Arthritic Diseases. Diseases of the Nervous System. Of the Vascular System. Of the Respiratory System. Of the Digestive System. Of the Liver. Of the Urinary System. Instruction for Case Taking.

**WATERS, DISEASES OF THE CHEST. Second Edition.**

The Diseases of the Chest. Their Clinical History, Pathology and Treatment. By A. T. H. WATERS, M.D., Fellow Royal College of Physicians. With Numerous Illustrative Cases and Lithographic Plates. 8vo. Price \$4.00

"The present edition contains new chapters on hæmoptysis, hay fever, aortic regurgitation, mitral constriction, thoracic aneurism, and the use of chloral in certain diseases of the chest; other chapters have received additions of cases and remarks on treatment. Some characteristic sphygmographic tracings have also been added."—*Boston Medical and Surgical Journal*.

**WEDL, ATLAS OF THE TEETH.**

An Atlas of the Pathology of the Teeth. By Prof. CARL WEDL, of Leipsig. 16 Full-page Lithographs, containing many figures, some colored. Quarto. Price \$10.00

BY SAME AUTHOR.

**DENTAL PATHOLOGY.**

With Special Reference to the Anatomy and Physiology of the Teeth. With Notes by THOS. B. HITCHCOCK, M.D., of Harvard University. 105 Illustrations. 8vo. Price, Cloth, \$3.50; Leather, \$4.50

**WHITTAKER, ON THE URINE.**

Student's Primer on the Urine. By J. TRAVIS WHITTAKER, M.D., Physician to Anderson's College Dispensary. With Illustrations Etched on Copper. 16mo. Price \$1.50

Physiological Study of Urine—Sensation in Passing. Quantity. Color. Odor. Specific Gravity. History and Behavior. Sediment or Deposits. Chemical Study of Urine—Reaction. Albumen. Chlorides. Ammonia. Urea. Phosphates. Blood. Sugar. Bile. Microscopical Study of Urine and Urinary Deposits—Amorphous Urates. Uric Acid. Triple Phosphates. Phosphate of Lime. Feathery Phosphates. Oxalate of Lime. Urate of Soda and of Ammonia. Cystine. Tyrosine. Leucine. Cholesteroline. Epithelium. Fat Globules. etc.

"The plates are possessed of great versimilitude, as well as in other respects admirable."—*Med. Times*.

"Neat and concise, and the illustrations are very good testimony of the claim which he makes of the suitability of the etching needle for delineation of microscopical appearances."—*Boston Med. and Surg. Journal*.

**WEST, THE DISEASES OF WOMEN. Fourth Edition.**

Lectures on the Diseases of Women. By CHARLES WEST, M.D. Fourth London Edition. Revised and in part re-written by the Author. With Numerous Additions by J. MATHEWS DUNCAN, M.D., Obstetric Physician to St. Bartholomew's Hospital 8vo. Price \$5.00

Drs. West and Duncan are, perhaps, the most celebrated London physicians giving attention to the Diseases of Women, and together have made a most complete work, either for the physician or student.

**WILKES, PATHOLOGICAL ANATOMY.**

Lectures on Pathological Anatomy. By SAMUEL WILKES, F.R.S. Second Edition. Revised and Enlarged by WALTER MOXON, M.D., F.R.S., Physician to and Lecturer at Guy's Hospital, London. 8vo. Price \$5.00

BY SAME AUTHOR.

**DISEASES OF THE NERVOUS SYSTEM.**

Lectures on Diseases of the Nervous System, Delivered at Guy's Hospital, London. New Edition, with Additions, Numerous Illustrative Cases, etc. 8vo. [Preparing.]

"A book of great value, embodying as it does the results of the experience and observation of one of the most accomplished of the London Hospital Physicians."—*American Journal of Medical Science.*

**WRIGHT, ON HEADACHES. Ninth Thousand.**

Headaches, their Causes, Nature and Treatment. By HENRY G. WRIGHT, M.D. 12mo. Price .50

**WILSON, ON DRAINAGE.**

Drainage for Health; or, Easy Lessons in Sanitary Science, with Numerous Illustrations. By JOSEPH WILSON, M.D., Medical Director United States Navy. One Vol. Octavo. Price \$1.00

"Dr. Wilson is favorably known as one of the leading American writers on hygiene and public health. The book deserves popularity."—*Medical and Surgical Reporter.*

"Well written and well illustrated. Attention to its teachings may save much disease and perhaps many lives."—*Cincinnati Gazette.*

"Interesting as well as useful."—*Philadelphia Ledger.*

"Easily understood, and briefly and concisely presented."—*Providence Journal.*

"Will be found of value."—*Boston Transcript.*

"Worthy of praise as a popular statement of the subject."—*Boston Journal of Chemistry.*

"Will be sure to be a harbinger of good in every family whose good fortune it may be to possess a copy."—*Builder and Wood Worker.*

BY SAME AUTHOR.

**NAVAL HYGIENE.**

Naval Hygiene, or, Human Health and Means for Preventing Disease. With Illustrative Incidents derived from Naval Experience. Illustrated. Second Edition. 8vo. Price \$3.00

**WILSON, DOMESTIC HYGIENE.**

Health and Healthy Homes. A Guide to Personal and Domestic Hygiene. By GEORGE WILSON, M.D., Medical Officer of Health. Edited by JOS. G. RICHARDSON, M.D., Professor of Hygiene at the University of Pennsylvania. 314 pages. 12mo. Price \$1.00

CHAPTER I.—Introductory, page 17. II. The Human Body, 33. III. Causes of Disease, 66. IV. Food and Diet, 119. V. Cleanliness and Clothing, 169. VI. Exercise, Recreation and Training, 187. VII. Home and Its Surroundings, Drainage, Warming, etc., 221. VIII. Infectious Diseases and their Prevention, 269.

"A most useful, and in every way, acceptable book."—*New York Herald.*

"Marked throughout by a sound, scientific spirit, and an absence of all hasty generalizations, sweeping assertions, and abuse of statistics in support of the writer's particular views. . . . We cannot speak too highly of a work which we have read with entire satisfaction."—*Medical Times and Gazette.*

BY SAME AUTHOR.

**A HAND-BOOK OF HYGIENE**

And Sanitary Science. With Illustrations. Fourth Edition. Revised and Enlarged. 8vo. Price \$2.75



**WILSON, HUMAN ANATOMY. Tenth Edition.**

The Anatomist's Vade-Mecum. General and Special. By Prof. ERASMUS WILSON. Edited by GEORGE BUCHANAN, Professor of Clinical Surgery in the University of Glasgow; and HENRY E. CLARK, Lecturer on Anatomy at the Royal Infirmary School of Medicine, Glasgow. Tenth Edition. With 450 Engravings (including 26 Colored Plates). Crown 8vo. Price \$6.00

Recommended as a Text-book at Rush Medical College, Chicago; Bellevue Hospital, New York; St. Louis Medical College; Yale and Dartmouth Schools; and many other Colleges.

"The present edition of the 'Anatomist's Vade-mecum,' has been prepared under the same editorial control as the Ninth Edition.

"Numerous additional wood cuts have been introduced, and full-page engravings of the bones, which have been drawn and engraved with great care, to secure accuracy, and to make them not mere anatomical diagrams, but artistic pictures."

BY SAME AUTHOR.

**HEALTHY SKIN. Eighth Edition.**

A Practical Treatise on the Skin and Hair; their Preservation and Management. Eighth Edition. 12mo. Paper. Price \$1.00

**WILSON, SEA VOYAGES FOR HEALTH.**

The Ocean as a Health Resort. A Hand-book of Practical Information as to Sea Voyages, for the Use of Tourists and Invalids. By WM. S. WILSON, L.R.C.P. Lond., M.R.C.S.E. With a Chart showing the Ocean Routes, and Illustrating the Physical Geography of the Sea. Crown 8vo. Price \$2.50

CHAPTER I. Curative Effects of the Ocean Climate. 2. The Various Health Voyages. 3. Time of Starting—Choosing a Ship. 4. Preliminary Arrangements. 5. Life at Sea. 6. Climate and Weather. 7. Management of the Health at Sea. 8. Occupations and Amusements at Sea. 9. Objects of Interest at Sea. 10. End of the Voyage—Future Plans. 11. The Homeward Voyage. 12. Australia: its Climate, Cities, and Health Resorts. 13. South Africa and its Climate. 14. The Meteorology of the Ocean.

APPENDIX A.—Outfit Required for a Voyage to Australia. B. Names and Addresses of some of the Principal Shipping Firms.

"All the information is supplied by, or based upon, the actual experience of the author; and the book may be confidently recommended to all who have to undertake, without previous experience, a sea voyage of any length. Medical men may consult it with advantage, and commend it to those patients whom they may advise to try the effect of a long voyage at sea."—*Medical Times and Gazette*.

"We have read every page of this book, and have derived both instruction and amusement."—*Lancet*.

**WELLS, OVARIAN AND UTERINE TUMORS.**

The Diagnosis and Surgical Treatment of Ovarian and Uterine Tumors. By T. SPENCER WELLS, M.D. [To be issued shortly.]

So long a time having elapsed since Dr. Wells has collected the results of his large experience in book form, the present volume will be eagerly looked for by all interested in this very important subject.

**WOLFE, ON DISEASES OF THE EYE.**

A Practical Treatise on Diseases and Injuries of the Eye. Being a Course of Systematic and Clinical Lectures to Students and Medical Practitioners. By M. WOLFE, F.R.C.P.E., Senior Surgeon to the Glasgow Ophthalmic Institution, etc. With 10 Colored Plates, and numerous other Illustrations. Octavo. Price \$7.00

**WALKER, INTERMARRIAGE.**

Intermarriage, or, The Mode in which, and the Causes why, Beauty, Health and Intellect result from certain Unions; and Deformity, Disease and Insanity from others. Illustrated. 12mo. Price \$1.00



**WOODMAN and TIDY, MEDICAL JURISPRUDENCE.**

Forensic Medicine and Toxicology. By W. BATHURST WOODMAN, M.D., Physician to the London Hospital, and CHARLES MEYMOTT TIDY, F.C.S., Professor of Chemistry and Medical Jurisprudence at the London Hospital. With Chromo-Lithographic Plates, representing the Appearance of the Stomach in Poisoning by Arsenic, Corrosive Sublimate, Nitric Acid, Oxalic Acid; the Spectra of Blood and the Microscopic Appearance of Human and other Hairs; and 116 other Illustrations. Large octavo.

Price, Cloth, \$7.50; Medical Sheep, \$8.50; Law Leather, \$8.50

"We have no hesitation in pronouncing the work to be one of unusual merit. More readable than Taylor, more systematic in its arrangement, and more practical in its instruction, it will prove to the medical jurist, not less than to the general practitioner, a storehouse of useful knowledge, conveyed in an unusually graphic style."—*Dublin Journal of Medical Science.*

"The authors of this truly great work have largely supplied the want felt, sooner or later, by almost every doctor."—*Cincinnati Lancet and Observer.*

"All the best known works on Medical Jurisprudence have been laid under contribution for the production of the present volume. It contains almost everything that can be found in other works on the subject; but it is no mere compilation. Dr. Woodman and Dr. Tidy have both thought out the subject for themselves, and, with rare industry and acumen, have brought together a mass of facts which is little short of astounding. The book is worthy to take its place alongside of any work on the same subject, and must prove of great use to all who practice in criminal courts, and to all medical practitioners. We have no hesitation in recommending it to our readers."—*London Lancet.*

"Altogether the work will rank with the best of its class as a medico-legal hand-book, and cannot fail to gain a wide popularity."—*New York Medical Record.*

"It cannot be otherwise than a valuable contribution to the boundless subject of medical jurisprudence."—*Albany Law Journal.*

"The scope of this book is very wide, and its execution worthy of all commendation."—*Philadelphia Legal Intelligencer.*

**WYTHE, ON THE MICROSCOPE.**

The Microscopist. A Manual of Microscopy and Compendium of the Microscopic Sciences, Micro-Mineralogy, Micro-Chemistry, Biology, Histology, and Practical Medicine. By JOSEPH H. WYTHE, A.M., M.D., Fourth Edition. 252 Illustrations. 8vo. Price, Cloth, \$5.00; Leather, \$6.00

An Index and Glossary have been combined in this edition, so as to be a source of valuable information. Notices of recent additions to the microscope, together with the genera of microscopic plants, have been given in an Appendix.

"From what we knew of the author of this work, as a skilled practical Microscopist, a successful teacher of the science, and a practitioner of medicine and surgery of long and varied experience, we had a right to expect a good book from his hands. Our expectations are fully realized in the volume before us. The style is clear and distinct, and one reads the book with the utmost facility of comprehension. It is the more valuable to the physician and medical student on account of its closer application of the microscope to medical subjects than we find elsewhere. The numerous plates, many of which are beautifully colored, are not to be excelled. We feel proud of it as an American production."—*Pacific Medical and Surgical Journal.*

"This is one of the most valuable text-books on microscopy ever offered to students or practitioners of medicine. This edition has been greatly enhanced in value by the addition of chapters on the use of the microscope in pathology, diagnosis, and etiology, and numerous new illustrations, some of which are from Rindfleisch.

"The author very carefully brings out every necessary fact and principle relating to the use of the microscope, and now that this instrument has become an essential part of every practitioner's armamentarium, a practical guide and reference book is also a necessity, and we are fully warranted in reiterating the statement that this is one of the most valuable text-books ever offered to students and practitioners of medicine."—*The Cincinnati Lancet and Clinic.*

BY SAME AUTHOR.

**DOSE AND SYMPTOM BOOK. Eleventh Edition.**

The Physician's Pocket Dose and Symptom Book. Containing the Doses and Uses of all the Principal Articles of the Materia Medica, and Original Preparations. Eleventh Revised Edition.

Price, Cloth, \$1.00; Leather, with Tucks and Pocket, \$1.25

"The chapter on Dietetic Preparations will be found useful to all practicing physicians, most of whom have but little acquaintance with the mode of preparing the various articles of diet for the sick."—*Boston Medical and Surgical Journal.*

"Many a hard-worked practitioner will find it a useful little work to have on his study table."—*Canada Medical and Surgical Journal.*

**WHEELER, MEDICAL CHEMISTRY.**

Medical Chemistry, Including the Outlines of Organic and Physiological Chemistry. By C. GILBERT WHEELER, M.D. Second Edition. 12mo.

Price \$3.00

**WOAKES, ON DEAFNESS AND GIDDINESS.**

On Deafness, Giddiness and Noises in the Head. By EDWARD WOAKES, M.D., London, Surgeon to the Ear Department of the Hospital for Diseases of the Throat and Chest. Second Edition. Revised and Enlarged, with additional Illustrations. 12mo.

Price \$2.50

"The early demand for a fresh edition of Dr. Woakes' volume is a sufficient criticism of its merits. . . . No brief summary of his views could do full justice to the cogency and subtlety of his reasons. We prefer to commend the whole work to the thoughtful perusal of all intelligent medical practitioners who desire to rise above the level of mere routine empiricism."—*Lancet*, August 28th, 1880.

"This book, although small, is evidently the result of much careful thought and observation. . . . We cordially recommend the work as original and suggestive, and as being likely to prove very useful in explaining both the causation of symptoms otherwise puzzling, and their appropriate treatment."—*Practitioner*, July, 1879.

**ILLUSTRATED BOOKS.****MEDICINAL PLANTS.**

Being Descriptions, with original Figures, of the Principal Plants employed in Medicine, and an account of their Properties and Uses. By ROBERT BENTLEY, F.L.S., Professor of Botany in the King's College, and to the Pharmaceutical Society, and HENRY TRIMENS, M.B., F.L.S., late Lecturer on Botany at St. Mary's Hospital Medical School. In 42 Parts, each, \$2.00, or in 4 vols., large 8vo, with 306 Colored Plates, bound in half morocco, gilt edged. \$90.00

**AN ATLAS OF TOPOGRAPHICAL ANATOMY.**

After Plane Sections of Frozen Bodies. By WILLIAM BRAUNE, Professor of Anatomy in the University of Leipzig. Translated by EDWARD BELLAMY, F.R.C.S., Surgeon to and Lecturer on Anatomy at Charing Cross Hospital. With 34 Photolithographic Plates and 46 Wood cuts. Large imp. 8vo. \$10.00

**ATLAS OF SKIN DISEASES.**

Consisting of a Series of Illustrations, with Descriptive Text and Notes upon Treatment. By TILBURY FOX, M.D., F.R.C.P., late Physician to the Department for Skin Diseases in University College Hospital. With 72 Colored Plates. In 18 Parts, each, \$2.00 or, 1 Vol., Royal 4to, Cloth. \$30.00

**AN ATLAS OF HUMAN ANATOMY.**

Illustrating most of the ordinary Dissections, and many not usually practiced by the Student. By RICKMAN J. GODLEE, M.S., F.R.C.S., Assistant Surgeon to University College Hospital, and Senior Demonstrator of Anatomy in University College. With 48 imp. 4to Colored Plates (112 Figures), and a volume of Explanatory Text. \$30.00

**A COURSE OF OPERATIVE SURGERY.**

By CHRISTOPHER HEATH, F.R.C.S., Home Professor of Clinical Surgery in University College, and Surgeon to the Hospital. With 20 Plates drawn from Nature by M. LÉVEILLÉ, and colored by hand under his direction. 4to. \$14.00

**ILLUSTRATIONS OF CLINICAL SURGERY.**

Consisting of Plates, Photographs, Wood cuts, Diagrams, etc., etc., illustrating Surgical Diseases, Symptoms, and Accidents; also Operative and other Methods of Treatment, with Descriptive Letterpress. By JONATHAN HUTCHINSON, F.R.C.S., Senior Surgeon to the London Hospital. Vol. I, containing fasciculi I to X, bound, with Appendix and Index. \$25.00

Fasciculi XI to XIV. Ready.

Each, \$2.50

# THE MICROSCOPIST.

FOURTH EDITION.

WITH TWO HUNDRED AND FIFTY ILLUSTRATIONS,

AND

Greatly Enlarged by the Addition of over 200 Pages of New Matter.

By J. H. WYTHER, A.M., M.D.,

*Professor of Microscopy and Histology in the Medical College of the Pacific,  
San Francisco, California.*

This Manual of Microscopy and Compendium of the Microscopic Sciences, Micro-Mineralogy, Micro-Chemistry, Biology, Histology, and Practical Medicine, in which the Practice of Medicine receives the largest attention, makes this work one of the most complete Text-Books known on the subject. Matters of mere curiosity have been but briefly referred to, while every necessary fact or principle relating to the microscope has been carefully stated and classified.

The chapters on the use of the microscope in Pathology, Diagnosis, and Etiology, which have been added to this edition, have been largely illustrated with wood-cuts from Rindfleisch.

The Index and Glossary have been combined in this edition so as to be a source of valuable information, and notices of recent additions to the microscope, together with the genera of microscopic plants, have been given in an Appendix.

No pains have been spared to render this manual a useful companion to the student of Nature, and an aid to the progress of real science. Cloth, \$5.00; Sheep, \$6.00.

"From what we knew of the author of this work, as a skilled practical Microscopist, a successful teacher of the science, and a practitioner of medicine and surgery of long and varied experience, we had a right to expect a good book from his hands. Our expectations are fully realized in the volume before us. In a little over 400 pages he has condensed almost everything of importance relating to the subject. The style, though almost aphorismal, is clear and distinct, and one reads the book with the utmost facility of comprehension. It is the more valuable to the physician and medical student on account of its closer application of the microscope to medical subjects than we find elsewhere. Too much praise cannot be bestowed on the mechanical execution of the volume. The numerous plates, many of which are beautifully colored, are not to be excelled. Added to this, the large and clear type and the fine quality of paper make it a most comely book. We feel proud of it as an American production, dividing its authorship and execution between the extreme west and east territorial limits of the Republic."—*Pacific Medical and Surgical Journal.*

"This is one of the most valuable text-books on microscopy ever offered to students or practitioners of medicine. This edition has been greatly enhanced in value by the addition of chapters on the use of the microscope in pathology, diagnosis, and etiology, and numerous new illustrations, some of which are from Rindfleisch.

"The author very carefully brings out every necessary fact and principle relating to the use of the microscope, and now that this instrument has become an essential part of every practitioner's armamentarium, a practical guide and reference book is also a necessity, and we are fully warranted in reiterating the statement that this is one of the most valuable text-books ever offered to students and practitioners of medicine."—*The Cincinnati Lancet and Clinic.*

P. BLAKISTON, SON & CO., Publishers,

PHILADELPHIA.



# MEDICAL TEXT-BOOKS

PUBLISHED AND FOR SALE BY

P. BLAKISTON, SON & Co.,

1012 WALNUT STREET, PHILADELPHIA.

---

- Day, Diseases of Children. A Practical and Systematic Text-book. 8vo. Cloth, \$5.00; leather, \$6.00.
- Mackenzie, Diseases of the Throat and Nose. Author's Edition, with the 112 Original Illustrations. 8vo. Cloth, \$4.00; leather, \$5.00.
- Holden, Practical Anatomy. Fourth Edition. Illustrated. Cloth, \$5.50.
- Bloxam, Chemistry, Organic and Inorganic. The most complete Text-book. Fourth Edition. 284 Illustrations. Cloth, \$4.00.
- Byford, The Medical and Surgical Diseases of Women. A New Edition; Rewritten, with New Illustrations. 8vo. Cloth, \$5.00; leather, \$6.00.
- Carpenter, The Microscope and Its Revelations. Sixth Edition. 500 Illustrations. Cloth, \$5.50.
- Beale, How To Work With the Microscope. Fifth Edition. 400 Illustrations. 8vo. \$7.50.
- Wilson, Human Anatomy. Tenth London Edition. 450 Wood-cuts and 26 Full-page Colored Plates. Cloth, 6.00; leather, \$7.00.
- Roberts, Handbook of the Practice of Medicine. Octavo. Cloth, \$5.00; leather, \$6.00.
- Trousseau, Clinical Medicine. Complete in two volumes. Octavo. Cloth, \$8.00; leather, \$10.00.
- Aitken, Science and Practice of Medicine. Third American, from the Sixth London Edition. Two volumes, royal octavo. Cloth, \$12.00; Leather, \$14.00.
- Sanderson, Handbook for the Physiological Laboratory. Exercises for Students in Physiology and Histology. 353 Illustrations. One volume. Cloth, \$6.00; leather, \$7.00.
- Cazeaux, Text-book of Obstetrics. From the Seventh French Edition. Revised and Greatly Enlarged, with Illustrations. Cloth, \$6.00; leather, \$7.00.
- Waring, Practical Therapeutics. From the Third London Edition. Cloth, \$4.00; leather, \$5.00.
- Rindfleisch, Pathological Histology. Containing 208 Elaborately Executed Microscopical Illustrations. Cloth, \$5.00; leather, \$6.00.
- Meigs and Pepper, Practical Treatise on the Diseases of Children. Sixth Edition. Cloth, \$6.00; leather, \$7.00.
- Wythe, Microscopist. A Manual of Microscopy. Fourth Edition, Revised, with 252 Illustrations. Cloth \$5.00; leather, \$6.00.
- Tanner and Meadows, Diseases of Infancy and Childhood. Third Edition. Cloth, \$3.00.
- Biddle, Materia Medica for Students. The Eighth Revised and Enlarged Edition, with Illustrations. \$4.00.
- Woodman and Tidy, Forensic Medicine and Toxicology. Illustrated. 8vo. Cloth, \$7.50; sheep, \$8.50.
- Hewitt, Diagnosis and Treatment of the Diseases of Women. Third Edition. Cloth, \$4.00; leather, \$5.00.
- Headland, on the Action of Medicines. Sixth American Edition. \$3.00.
- Meadows, Manual of Midwifery. Third Enlarged Edition, including the Signs and Symptoms of Pregnancy, etc. Illustrated. \$3.00.
- Fothergill, Complete Manual of the Diseases of the Heart and Their Treatment. Second Edition. \$3.50.
- Tanner, Index of Diseases and Their Treatment. A New Edition. \$3.00.









